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51



*with the kind regards of*  
*Edward Jesse*  
LECTURES

ON

NATURAL HISTORY.

BY

EDWARD JESSE, Esq.

AUTHOR OF "GLEANINGS IN NATURAL HISTORY," "ANECDOTES  
OF DOGS," "FAVOURITE HAUNTS AND RURAL STUDIES,"  
"AN ANGLER'S RAMBLES," "WINDSOR AND ETON,"  
ETC., ETC.

DELIVERED AT

THE "FISHERMEN'S HOME," BRIGHTON.

Second Edition,

WITH ELEVEN ADDITIONAL LECTURES.

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These Lectures

ARE DEDICATED TO

THE BRIGHTON FISHERMEN,

BY THEIR

SINCERE FRIEND AND WELL-WISHER,

EDWARD JESSE.

M361868





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NOTE.—*Lectures XII. to XXII. of this Edition have not before been published, the first edition only consisting of twelve lectures.*

## INTRODUCTION.

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SOME of the readers of the following Lectures might wish to be informed what induced the Author to write and deliver them to the Brighton Fishermen. It may, therefore, be stated, that the occupation of these men kept them very frequently for days together at sea, often on Sundays. The consequence was, that they became much neglected, both as to their temporal as well as their spiritual improvement. Indeed, there was a time when a part of the beach at Brighton exhibited a scene of quarrelling, swearing, and drunkenness, such as was seldom witnessed. It is far different now, for, owing to the exertions of some benevolent persons, an arch, capable of containing about eighty persons,

was hired for their use. This has been floored, white-washed, lighted, and warmed; and the walls covered with many amusing and instructive drawings and coloured prints, presenting a very cheerful aspect. Seats and small tables have also been provided, together with a library of amusing and instructive books, in addition to newspapers and periodicals.

When the "Home" was thus completed, the Author was requested to inaugurate it with a Lecture, which he willingly undertook to do. It was listened to by a most attentive audience, and suitable addresses were also made to the men by his friend Mr. Cordy Burrows, and other gentlemen present. These lectures were continued from time to time, as occasions offered, during the period the Author remained at Brighton, and last winter he resumed the practice; and he has reason to be gratified with the result of his labours, for his assertion will be borne out by many others, that a more well-conducted, sober, and attentive set of men than his hearers have seldom been collected together.



But his success must not be attributed exclusively to the Lectures. The fishermen have been induced to abandon the ale-houses and beer-shops (those curses of labouring men), in consequence of being amply and liberally supplied with good hot coffee at all times of the day, and until nine o'clock at night. This, they find, does them more good than either spirits or ale, and they thus avoid those miseries and that poverty which drunkenness is sure to bring, with all its curses, on themselves and their families. Thus, by the judicious use of coffee, the men have become a sober class, and are enabled to make deposits in Savings' Banks, and can therefore feel that they are independent of sickness and occasional want of employment. This fact is one of great social importance, and might be beneficially followed in every town and village in England. Indeed, those benevolent persons, especially females, who visit the dwellings of the poor, might teach them how to roast, grind, and make coffee. All that is wanting is an iron tray, and a wooden pestle and

mortar, for the purpose, and they would cost but a mere trifle. These, with a pound or two of coffee-berries, and a lesson for the use of them, would be an acceptable and useful wedding-present for the bride of a working man, and might tend to win her husband from resorting to an ale-house.

But to return to the Lectures. They were written partly from the Author's own notes; and were, in part, extracted from different works on natural history. Some of them have been read and approved of by the Author's friend and neighbour, Professor Owen; and he, therefore, submits them with some little confidence to the public. He may add, that the instruction contained in them may be found useful in schools, and to the young generally. Where they have been read to children they have been listened to with attention and pleasure.

EDWARD JESSE.

*East Sheen, Surrey,  
July, 1861.*

PREFACE  
TO  
SECOND EDITION.

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THESE Lectures were written for the instruction as well as for the amusement of the Fishermen of Brighton, a fine class of men, but whose moral conduct had previously been but little attended to. In fact, their occupation had been on the wide seas, and when driven on shore, too much of their time and most of their earnings had been spent in beer-shops and ale-houses.

When the Author first began to read these Lectures to them, he was repeatedly told that his time and trouble would be thrown away. So far from this having been the case, he can confidently appeal to many of the inhabitants of Brighton, whether there is in that town a more sober and better-conducted class than the fisher-

men belonging to it. Ale-houses have been altogether abandoned—sums of money have been deposited in Savings' Banks; places of worship are attended, and the Author can look on the good, honest faces of his audience with the greatest gratification.

If these Lectures, therefore, have amused and instructed these fishermen, he trusts that they may also amuse and instruct others, especially the young, to whom the study of natural history not only offers an inexhaustible fund of pleasing amusement, but it tends to promote the love of the Creator for His goodness, to repose an implicit confidence in His wisdom, and to see in everything around him proofs of an all-wise and beneficent Providence. He will then be ready to exclaim,—

“On every thorn, delightful wisdom grows;  
In every rill, a sweet instruction flows.”

EDWARD JESSE.

16 *Belgrave Place, Brighton,*

*May, 1863.*



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[From the *Brighton Herald* of January, 1860.]

At the foot of the Ship-street "Gap," Brighton, there is a series of arches built in the face of the cliff; and in one of these a very novel and interesting scene took place on Thursday evening. It is known as the Fisherman's Home and Reading-room, and is a warm, comfortable, well-lighted place, perfectly adapted to induce the beach population to prefer a cup of coffee and a book to the expensive luxury of the beer-shop. In this room were gathered as many seamen as could be crowded into it, this being a kind of inaugural assembly,—one of, we hope, a long series of nights on which the members of the Home will meet for readings, songs, and other means of rational amusement.

As this was the first, so it was a special night, marked by the attraction of a special paper written for the occasion by Mr. Jesse. He did not, however, read his own paper.

Alderman Burrows undertook that task; but, before commencing the reading, he took occasion to observe that this Institution had been provided by persons taking an interest in those who were not so well able to help themselves, in order that the fishermen frequenting this beach might have a nice, warm, dry, comfortable apartment, in which they might read newspapers and books provided for them, so that they might be led to make an intelligent and right

use of those faculties which the Almighty had bestowed upon them. By educating himself, a man was the better able to appreciate the advantages of a good and virtuous life, and also to discriminate between right and wrong, so that he might do his duty towards his neighbour, his duty towards himself; and in the performance of those two duties he would be doing the greatest of all duties, that towards his Maker. It was with this conviction that this Reading Room had been provided; and it gave him much pleasure to see it so full this evening. If the fishermen only showed their appreciation of it by their attendance, an adjacent arch would also be fitted up, and there would thus be accommodation for double the number. In the meantime, as many among the fishermen had not the advantage of education, it had been thought desirable that there should be some one to read aloud some amusing book in the room of an evening: he had pledged himself to do so once a fortnight, and if other gentlemen would do the same, there would, with very little trouble, be an amusing and instructive entertainment provided there almost every evening in the week. It was a source of pleasure to find many persons taking a warm interest in this Institution, which was to a considerable extent self-supporting,—and it is always a pleasure to help those who help themselves. He was accompanied by a very dear and affectionate old friend, Mr. Jesse, who had kindly prepared a paper on “Singular Facts Relating to Fish,” *expressly for this occasion*.

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[From the *Brighton Herald* of February 6th, 1860.]

“Really our fishing population have reason to be grateful—they ought to consider themselves highly favoured—when a gentleman of Mr. Jesse’s talents and years, visiting Brighton for the benefit of his health, takes so much interest in their behalf as to write for their especial use and instruction such valuable and interesting lectures as he has done; and, moreover, to have those lectures printed and sold, as he promises to do, for the benefit of their ‘Home.’ The men evidently *do* appreciate Mr. Jesse’s kindness, as a token of which they have returned their thanks to him as follows:—

“‘We, the undersigned fishermen and boatmen of Brighton (and others present), beg to return our sincere thanks to Mr. Jesse for writing and reading his good lectures.

(Signed)

“‘Joseph Salvage, Richard Markwick, George Young, Jim Shrivell, William Pentecost, Thomas Pentecost, George Priest, and Philip Collins (fishermen).

Joseph Wells, James Harries, and Friend Payne (seamen).

Thomas Laycock, John Measor, Francis Measor, Richard Gillam, Thomas Daws, James Mockford, William Bray, Samuel Akehurst, George Gunn, John Gooding, George Harman, Philip Barnard, Thos. Bassett, John Laycock, James Bassett, Thomas Bassett, sen., George Monk, John Barton, and George Jeffery (boatmen).’”





## LECTURES, &c.

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### I.

#### SINGULAR FACTS RELATING TO FISH.

MY DEAR FRIENDS,—

I am going to read you something about fish, as you are all fishermen; but not all about the fish of this country, as you know them well, but about the fish of hot countries; and what I am about to say of them will, I am sure, interest you. The facts I am going to state are well known to observant naturalists, and are sufficiently authenticated to leave no doubt of their truth. In the East Indies, Ceylon, and other hot countries, there are numerous ponds and tanks, which in the rainy season are well filled with water as well as with fish. When the sun afterwards blazes forth in all its tropical heat,

these ponds and tanks are dried up, and you would suppose that the fish would also be dried up with them. But this is not the case. The fish have the power of penetrating deeper and deeper into the mud as it gradually dries, till they find a sufficient moisture to keep them alive till the periodical rains come some months afterwards, when they find their way back again into the water. In the meantime, their retreat is occasionally disturbed by the natives, who dig down and find them generally at a depth of two feet. The soil is clay, into which they have the power of burying themselves. In some of the sandy plains of the East Indies there are large but shallow ponds, or rather hollows, which are filled in the rainy season, but in hot weather are perfectly dry. As they become so, great numbers of small fish may be seen dead on the sandy surface; but on the recurrence of heavy rains these hollows are again stocked with fish.

Now, Dr. Buist, a learned and observant naturalist, gives us many instances of fish having fallen from the clouds. He tells us that, on the 19th February, 1830, at noon, a heavy fall of fish occurred at Nokuthatty factory, and that

attestations of the fact were obtained from nine different parties. The fish were all dead; some fresh, others not. They were seen in the sky like a flock of birds, descending rapidly to the ground. Again, he says that, on the 16th and 17th May, 1833, a fall of fish occurred near Futtehpoor, after a violent storm of rain. The fish were from  $1\frac{1}{2}$ lb. to 3lbs. in weight, and all dead. Some fish fell at Meerut, while Her Majesty's 14th Regiment were out at drill, and were caught in numbers. At another time, during rain, a quantity of live fish, about 3 in. in length, fell about 20 miles from Calcutta; they were all of the same kind. Many other instances might be mentioned; one vouched for by the late Governor of Ceylon, Sir Emerson Tennent, who, while riding out after a heavy rain, observed many small fish alive on the road. After these facts, I should mention that, if showers of fish are to be explained, it must be on the assumption that they are carried up by squalls or violent winds from rivers or spaces of water not far away from where they fall. An instance also occurs to me, in this country, which was seen by a friend of mine. He had a garden surrounded by a high wall, with a

dry soil. After a heavy fall of rain, the garden was filled by myriads of small frogs, which must have descended from the clouds.

After these remarks on the showers of fish, I may tell you what is still more extraordinary—that some fish in Ceylon, in the dry season, leave the pools when they contain but little water, and can make their way through the grass to other pools, going to them in one direct line. Some fish, also in Guiana, have been seen travelling overland during the dry season, in search of their natural element, in such droves that the negroes have filled their baskets with them. Sir John Bowring, in his account of the embassy of the Siamese kings, in 1855, states that in ascending and descending the river Meinam he was amused with the curious sight of fish leaving the river, gliding over the wet grass, and losing themselves amongst the trees of the jungle. Whilst travelling on land, the fish have their gills open or expanded. The class of fish which have this power of moving on land have some of their bones so disposed in plates and cells as to retain a supply of moisture, which, while crawling along, gradually exudes so as to keep

the gills damp. Another small species of fish is often seen travelling along a hot and dusty road in Ceylon, under the mid-day sun, in search of water. Extraordinary as these facts may appear to you, they are perfectly well vouched for; also, that a species of perch in Ceylon, of a very peculiar formation, has been seen to ascend trees, in search probably of some food,—insects most likely.

Now, in hearing what I have to say to you, I must request you to bear in mind that a Benevolent Creator has endowed animals, fish included, with that formation and those instincts which are necessary for their self-preservation. I will give you a proof of this which is familiar to you. You know that many flat fish,—soles, turbot, &c.,—have brown and white surfaces. When they are attacked by other fish which prey on them, they remain flat on the white surface of their skins, showing only the brown surface, which is generally the colour of the sands on which they feed; and thus they escape the observation of their enemies. So it will be found to be all through Nature. Every animal is furnished with either some means of escape, of defence, or of cunning. Some are



swift, and some are strong, and others hide themselves from their enemies in holes in the earth. But all are fed in some way or other by the same Almighty hand which created them. You will find a beautiful reference to this in Psalm cxlv.:—

“The eyes of all wait upon Thee, O Lord ; and Thou givest them their meat in due season.

“Thou openest Thine hand, and fillest all things living with plenteousness.”

If God thus care for the birds of the air, the beasts of the field, and the fishes of the sea, be quite sure that He will take care of you if you place trust in His goodness. When out at sea in your boats, exposed perhaps to boisterous and contrary winds, as most of you must have been, then lift up your hearts to that Good Being who can make the storm to cease and the waves to be still. You will always find this a great comfort and relief, especially when you are in any danger.

Let me now give you an instance or two of the goodness of Almighty God to His creature man. You are aware that mackerel, herrings, pilchards, sprats, &c., are caught in vast num-

bers at certain seasons of the year, though perhaps you may not be aware that there are as many hills, and, probably, mountains, in the sea as there are upon dry land;—this has been partly ascertained in laying down the cable across the Atlantic. Now, these hills are covered with marine plants, like a forest or jungle; and you might suppose that, for purposes of concealment or protection, these gregarious fish would resort to such places to deposit their spawn; and if they did, you may well suppose how few would be taken in your nets. Now, a benevolent Providence has designed that these fish should become useful to man. And so they are, to a great extent; for, besides affording food to many in this country, they are exported to different parts of the world. I must now tell you that no spawn of fish will vivify, or become productive, without light. There is, then, a powerful instinct implanted in them, which compels them to resort to shallow places in the sea, in order to deposit their spawn under the influence of light, and where you are enabled to use your nets to advantage. These gregarious fish, or fish which go in shoals, are pursued by many enemies

besides yourselves: gulls, porpoises, and other fish follow and feed on them, and yet nothing drives them from the shoals. It is the incredible numbers alone which keep up the annual migration.

Before I conclude, I wish to call your attention to an unusual occurrence which took place along our coasts about four years ago, and which some of you may, perhaps, be able to give some explanation of. At the time referred to a very heavy fall of snow took place, and soon afterwards great numbers of conger-eels and many other fish were picked up perfectly blind. Now, some of these eels and fish were examined by Professor Owen, the head of the Natural History Department in the British Museum, and second to no one as a scientific anatomist. His report was that the eyes of the fish he examined were covered with an opaque substance, which produced total blindness. This curious fact was not confined to fish off our Brighton coast. At Southampton, and many other places, grey mullets and other fish came on shore perfectly blind; and I picked up what, I believe, is called the parrot-fish, in the same state. It is not easy to account for this sudden

blindness. I am aware that some attribute it to the fall of snow; but why conger-eel and other deep-sea fish should be affected by it is a mystery not easy to be solved. I shall, therefore, be glad to hear what any of you have to say on the subject. Let me add that fishermen enjoy the advantage over landsmen of seeing the sun rise on a beautiful morning, shedding its gilded rays over the rippling waves far out at sea, and also of viewing the glorious setting of the same luminary. These are sights which may well excite your admiration, and which ought to raise your thoughts to that Great and Good Being who has preserved your lives in the midst of many and great dangers, and at this moment enables you to meet together in peace to receive instruction and amusement. May He bless you all!

## II.

## SECOND PAPER ON FISH.

MY DEAR FRIENDS,—

In my last lecture to you I endeavoured to address you in that mood and way which would best come home to your feelings, and show you that I had only one object in view, that of amusing and improving you. In fact, I wished you to consider me as your true friend, and such, I hope, I shall be found to be. You appeared to listen attentively, as well as to like what I wrote for you, a few evenings ago, on the subject of fish in hot countries. Some of you might have thought that what I then said respecting fish making their way over land to other waters and of their climbing up trees was not very probable; nor can I wonder at it. Now, I wish you to consider for a moment the possibility of fishes being differently constructed



or formed in some countries to what those are which you take in your nets off the Brighton coast; and in so doing always bear in your minds that Divine Wisdom knows no bounds. His will is the well-being and well-doing of all His creatures, each of them in its own place or sphere, and His Almighty power enables Him to give peculiar formation and faculties to those beings which His wisdom created and His will decreed.

After these remarks, I may tell you that it is by a muscular movement of their ribs that fish can propel themselves along dry land, somewhat in the same way that eels and serpents are known to do. Now, if you will look at this sketch of a fish I have brought with me, you will see that what may be called ribs can be used as organs of muscular motion, according to the will of the animal. I should be making this lecture of too great a length if I were to enter more minutely into the particulars of the anatomy of these crawling fishes; but I hope enough has been said to convince you that they exist. As to the fact of fish ascending trees, I will only mention one proof of it, which is, that there is a little climbing perch well known to

naturalists, and which is found in the mangrove swamps. It can ascend trees like a chimney-sweep, and this it does by only using a pair of prickles from the gill-flaps, instead of elbows, and thus it gains the tops of stems many feet above high-water mark, picking off the flies that alight on the tree it climbs up.

But let us now turn to flying fish. There are several different species of these, and they are sadly persecuted, being pursued in the sea by bonitos and other rapacious fishes, and take flight when they are in danger from them. While in the air, the frigate and other marine birds make them their prey. It may seem to you surprising that there should be flying fish as well as creeping and climbing fish, and yet they are known to exist.

Many of you, no doubt, have heard of the sea-cow. It appears a mass of blubber and almost incapable of motion, yet its fins are covered with a sort of nails which enable it to crawl on shore, assisted by its pectoral fin, and also to get on the ice. I mention this to prove to you that the fins of these creatures are as curious as the formation of the fish referred to, and that in both cases the fins of the sea-cow, and the muscular

movement of the bones of crawling or climbing fish, serve the purposes of feet.

I now wish to call your attention to some of the enormous monsters which are to be found in more distant seas; for, fortunately for you, you have not to encounter them in your nets off these shores. One of these is called a squill. It is provided with several arms of enormous length, and when living it is said to be as transparent as crystal. It has a large mouth, and its eyes are of a sky-blue colour, embedded in the substance of the head. This monster is said to form part of the food of the whale. I will now relate an anecdote of the squill. The captain of a whaler landed on a small, uninhabited, rocky island in the South Pacific, with one of his mates, in search of curious shells. The tide was receding, and the mate, having gone a few feet up a rock, found a squill adhering to it. Never having seen one of them before, he disturbed it, when the creature endeavoured to flounder down to the sea. The man intercepted it in its course, when it raised itself up, and seized him with its long arms, squeezing him in such a way that he felt as if all his bones would be broken, at the same time it breathed hot air into his

face, and glared at him with its blue and angry eyes. In this extremity the mate called out to the captain, who luckily was near, and who came and released him by cutting in two the arms of the squill with a large knife which he had with him. Had it not been for this interference, the man would have been killed and his body fed upon afterwards. In the Mediterranean these creatures are found, but of an inferior size. They spread themselves on the ground, and, when persons are bathing, instances have been known of their being seized and killed by the squills.

There is another monster found in the West Indies called the sea-eagle, because in its rage and anger it sometimes elevates itself with such force as to raise the sea into a foam, and makes a noise like thunder. One of the species, called by sailors the sea-devil, was taken at Barbadoes, and was so large that it required seven pairs of oxen to draw it on shore. Sharks and rays, which are nearly allied to them, are known to have been caught of the enormous length of forty feet.

You may well ask, What can be the use of these and many other monsters of the deep? I



will endeavour to explain this to you. You know that quadrupeds in general only have one young at a time, while a fish will produce a million; and, indeed, it is calculated that a cod-fish alone will put forth nine millions of eggs in one year. Now it is evident, that if it were not for these monsters, which open their enormous mouths and throats and swallow the smaller fish by hundreds, the ocean would soon be filled with them, and there would scarcely be room for other marine animals. Only think for one moment how gregarious fish, such as mackerel, herrings, &c., would increase and multiply if it were not for your nets, and the predatory creatures which feed upon them. Remember also that He, whose tender mercies are over all His works, has fitted the creatures thus exposed to destruction for their fate; and we may therefore conclude that, being what are called cold-blooded animals, they do not suffer from great pain and anguish. The tremendous animals I have referred to also devour all carcases, &c., which may be found floating in the water, and thus they serve to purify the ocean, as hyænas and vultures do upon earth. I will mention another lesson which may be learnt from the



existence of these monsters; for, if God fitted them to devour, He fitted them also to instruct. The existence of creatures so evil, and such relentless destroyers of the works of the Almighty, teaches us that there are probably analogous beings in the spiritual world, and which should warn us to use great care and watchfulness in our conduct, in order that we may escape their destructive fury. You see, I occasionally give a little good advice while I am endeavouring to amuse you.

Nothing is more remarkable than the infinite variety and singularity of the figures and shapes of fishes. It has been thought that the ocean contains representatives of every animal that is to be found on the earth, or in the air—at all events, the forms of fishes are more singular and extraordinary than those of any other department of natural history. Amongst the animals of South America, one of the most curious and interesting is the gymnotus, or electric eel—so strong is their electric power, that it is said they can kill a fish by it (and on which they feed) at a distance of sixteen feet. Lacepède, the celebrated French naturalist, is my authority for this statement. They abound in

the rivers and ponds of South America. When the Indians want to catch them, they assemble and drive the wild horses of the plains, by shouts and other means, into the river. The electric eels then attack them: now and then a horse will receive so severe a shock that he is killed. Others contrive to swim across the river, and then throw themselves down exhausted on the opposite bank. The eels are thus deprived of their electric power for a time, and are then speared by the Indians, who feed on them. There is another singular fish, which is able to bring its prey within its reach by discharging a different element than that of the electric eel, and that is water. It is a small fish, remarkable for its singular shape, the brilliancy of its colours, and the quickness of its movements. It may be called the fly-shooter, from its food being chiefly flies and other insects, and especially those that are found on aquatic plants. When it sees one of these on a leaf, it blows out a drop of water with some force, which knocks the fly off the leaf, and it then feeds on it. I will mention another fish, and an ugly one it is, which you are probably

acquainted with, for it is found in all the European seas. They are sometimes called fishing-frogs, from their resemblance to that animal; but I believe you call them sea-devils. It is a large fish, and has been caught seven feet in length. Now, this fish has no defensive arms, nor strength in its limbs, or quickness in swimming; but it is a cunning fish, as I will prove to you. In order to procure its food it hides itself in the mud, covers itself over with seaweed, or conceals itself among stones, and lets no part of it be seen but the end of some fringes of its body, which it moves and agitates in different directions, so as to make them appear like worms or other baits. Fishes, attracted by this apparent prey, come near this sea-devil, when he catches them in his enormous throat, which is furnished with almost innumerable teeth. There is another of this species which has only a single, what may be called, bait, just above his mouth. You see in this case of the sea-devil, that if it cannot pursue and overtake and seize its prey, it is enabled—as in the case of the electric eel and the fly-shooter—to do so in a way we should not ex-

pect; thus showing the beneficence, wisdom, and power of the Great Creator, and to which I am always glad to call your attention.

I will only mention the habits of one or two other fish, as they may interest you. The hussar fish of Demerara, and the black goby of the Mediterranean, each makes an artificial and prettily-made nest; the first of fresh-water plants, and the other of sea-weeds. They protect their spawn and defend their young fry, observing in this way all the instincts of birds that lay eggs. The little sticklebacks of our brooks in England do the same. The little frog fishes have side-bags full of water, and pectoral fins, like feet. They hop about for hours on the sands, left dry by the retreating tide, to prey upon the sand-hoppers, &c. The mud-fish of the river Gambia, in Africa, when the stream falls low, burrows and coils itself up in a deep mud-cellar, leaving a little hole for air, which its swim-bladder deals with like a lung. When the rainy season returns it comes out, and then breathes as fish do. It is a true amphibious creature, that is, it can exist both on land and in the water.

I have now done, and trust that I have in-

terested you. From my advanced age, I may not be spared to come amongst you another year; but while I live I shall always be delighted to hear that you duly appreciate and avail yourselves of the advantages prepared for you in your Fisherman's Home.



## III.

## ON BIRDS.

MY DEAR FRIENDS,—

I have given you two lectures on foreign fish; and, as they appeared to amuse you, I will now read you one on birds, because, except gulls and a few marine birds, you are not very likely, from your occupation as fishermen, to know much of their habits and peculiar instincts. These are well worth your attention, and I hope that what I shall have to say on this subject may both instruct and amuse you. But, before I proceed further, I wish to say a word respecting the gulls which dip and flit and fly about these shores, in a way which every lover of nature, and every visitor to this town, must always admire. Now I ask of you, as a little return for the trouble I have taken in writing these lectures for you, to protect these interesting birds as far as you are

able to do so. I always watch their flight with the greatest satisfaction : it is one of the sights which renders my visit to Brighton a pleasing one. Besides, they are useful birds ; for, if you take a stroll on the Downs when land is being ploughed up, you will perhaps see gulls following the ploughman, and picking up the grubs of many of those insects which are so injurious to the farmer.

As there are but few trees and bushes in the more immediate neighbourhood of Brighton, I am afraid that you are not often gladdened with the song of the blackbird, thrush, and nightingale, though you have probably heard the cheerful notes of the lark, as he pours them forth, and approaches to heaven nearer than any other bird. The lark makes its nest always on the ground, and generally early in the spring, in grass fields. If you examine the claws of a lark,—which you may do at Mr. Sinnick's or any other poulterer's, where, I am sorry to say, too many of them are to be found,—you will find that these claws will readily take up one of the eggs of these birds. When, therefore, the mowers either approach to or mow over their nests, they will take up an egg in each foot, as I

have seen them do, and convey them to some more secure place, returning quickly for the rest, till all are removed. Now, in viewing the structure of the foot of the lark, one cannot help admiring the goodness of a benevolent Creator, who has thus supplied one of His creatures with the means of rearing its young. Should the egg be only just hatched, the young will be removed in the same way.

I will now tell you that there are about forty different sorts of tender and, generally, what are called soft-billed birds,—that is, birds that feed on insects,—which arrive in this country from far-distant places every spring. You may not be aware that these little birds perform their long journeys in the night, led by an unerring instinct, which the Great Creator has implanted in them. This fact I have ascertained from some of the keepers of lighthouses, who have informed me that they have occasionally found these birds, early in the morning, killed by flying against the revolving light. They have also found woodcocks, snipes, and other birds, dead, showing that they also migrated in the night. As another proof of this curious fact, I may mention that, riding out early one morning in a meadow,

a large flock of swallows dropped on the ground near me, and so much exhausted that they appeared incapable of moving, although I rode my horse amongst them. After resting some time they took flight, and dispersed in various directions. Swallows are supposed to migrate to this country from Africa, Italy, Spain, Greece, and other places. A captain of a ship assured me, that when he was at a long distance from land, numerous swallows settled on his rigging, as a resting-place. They are a useful bird, destroying myriads of flies; for they are on the wing, catching them, from the first light of day till late in the evening. It is a pretty sight to see them thus employed. They are sensible, clever birds, and I will give you one or two instances of this. You know that swallows make their nests of mud or clay. Now sparrows are apt to take possession of these nests and lay their eggs in them. When the hen-sparrow is sitting on them, a number of swallows will collect together, each with some clay in its mouth, and, in an instant, stop up the hole of entrance, thus leaving the sparrow to starve to death in the nest she had stolen. This fact I observed myself, and also the following:—A pair of sparrows had

driven a pair of swallows from their nest, laid their eggs in it, sat on them, and hatched six young ones. When this took place, a number of swallows came and pecked down their former nest, and I saw the helpless young sparrows on the ground, where they soon perished. A third instance of this combined intelligence in birds was communicated to me by the late Sir Henry Willock, who was our Ambassador in Persia. There was a ruined tower opposite his window, at Teharan, on which those migratory birds, the storks, came year after year to make their nest. On one occasion a pair of peafowl forestalled them, and took possession of the tower and began to prepare a nest, driving the old storks away. After a short time a number of these latter assembled, attacked the peafowl, drove them away, and remained near the spot until the original storks were securely established on the tower. Now you must perceive that this faculty of communicating their wants and of exciting their congeners, or others of their own species, to assist in revenging their wrongs, is not only curious, but wonderful. How this is done must be left to conjecture, except that it is an impulse implanted in them by their Divine Creator.



Dogs that have been ill-treated by a larger one have been known to entice another to revenge their cause.

I will now tell you a little about the cuckoo—a bird, I am afraid, you seldom hear at Brighton; but it arrives in this country early in the spring, and its unvaried notes seem to proclaim fine and pleasant weather. It is a lazy bird; for, instead of sitting on and rearing its young, as all other birds do, it deposits its eggs, but only one, in the nests of other birds, selecting always those of insectivorous birds, that is, of birds which feed their young only on insects: these are generally robins, wag-tails, and hedge-sparrows. Now, the cuckoo is as large as a blackbird, and requires a great quantity of food, It is evident, therefore, that if the parent robin, &c., had to feed their own young as well as the voracious cuckoo, some of them would be starved. In order to prevent this, the latter is furnished with a hollow in his back, in which he contrives to get the newly-hatched robin or hedge-sparrow, and then throws them out of the nest one by one, remaining sole possessor of it. Having done this, he is readily fed and brought up, though it requires all the exertions of his foster-parents in

order to supply his enormous appetite. There is another curious fact connected with the cuckoo. There was a small hole in the wall of my garden, in which a robin had built its nest. Now, it was quite impossible that a cuckoo could get into it to lay its egg, and yet I found a young cuckoo in it. She must, therefore have dropped her egg on the ground near the hole, and either taken it up in her mouth, or in her foot, and placed it in the nest.

Perhaps you are not aware that there is a great difference between rooks and crows, although it is very usual to call them all crows. The rook feeds on worms, slugs, &c., and is very useful to the farmer; while the crow is not only a great thief, but will kill, if he can, other birds, in order to make them his prey. A gentleman driving one day in his gig along a lane in Shropshire, saw a house-pigeon pursued by two carrion crows,—so they are called from eating carrion,—as they were probably hungry, and wanted the pigeon for food. The latter, becoming exhausted, fled for refuge into a tall, thorny hedge. One of the crows, however, stationed himself above the pigeon, and the other below it. They then got nearer and nearer to

the poor bird, who, seeing its danger, left the hedge, but was immediately followed and seized by one of the crows. To the surprise of the gentleman who had watched the whole proceeding, he saw the crow rise up into the air, and at last fall down dead; one of those active little animals, called weasels, had fastened on him. This serves to illustrate the old proverb of the biter being bit. The pigeon was afterwards picked up alive, and taken home by the gentleman referred to. I will now tell you another anecdote of the crow. In the Island of Ceylon there is a very cunning and impudent one, not black, as ours are, but with a brown or bronzed back. In the court-yard of the house of the Governor of Ceylon a large dog was chained up, and was employed one day in picking the meat off a bone which had been given him. One of these crows alighted near him, and showed a wish to partake of the bone. This the dog would not allow, so the crow flew away and soon returned with a companion, who was placed near the tail of the dog, and the other took his station as near as he could venture to the coveted bone. The crow near the dog's tail then gave a strong pluck at it, when the dog

turned quickly round to see who had taken this liberty with him. This was the opportunity wanted, for the first crow seized the bone and flew away with it, followed by his companion, and they no doubt enjoyed it together in some secure place. You see this is another proof of what I have said of combined intelligence and communication in animals. The above curious anecdote is related by the late Governor of Ceylon in his history of that island.

There is another cunning bird, which Shakspeare calls the maggot-pie, but we the magpie. In a tame state they are easily taught to talk, which they will sometimes do quite as distinctly as a parrot; in a wild state they now and then make a chattering noise, but do not often collect together as rooks do, although some years ago I counted more than twenty in one flock on the Brighton Downs. They make curious nests, using a large quantity of thorny sticks and brambles, and sometimes place them in odd situations, as I am about to tell you. You have heard of the celebrated Dr. Johnson, who, almost without assistance, and in the midst of poverty, completed that wonderful Dictionary,—a proof of his great learning and extensive read-



ing,—which is called after him. In his more prosperous days he went a journey into Scotland, accompanied by his friend Mr. Boswell; and as he was a large, heavy man, he had a stout stick in proportion to his size. Now, it so happened that he lost this stick, and deplored his loss very much. His companion, in order to comfort him, said that it would be found again. “Never!” said Dr. Johnson: “consider, sir, the value of such a piece of timber in this country!” Thus you see that trees were not very abundant in those days in Scotland. This being the case, a pair of magpies, for want of a better place, resolved to make their nest in a gooseberry-bush in a garden. They brought great quantities of brambles, sticks, and gorse, or furze, and made it so large, and with so many twistings and turnings in it, that no arm (even if it were as long as my own,—and that is pretty long, as you may see,) could reach either the eggs or the young ones. It was considered a curiosity, and was suffered to remain unmolested; and there it may be, for all I know, at present, although the Scotch are a thrifty people, and might not like to lose their crop of gooseberries.



I do not know whether any of you have seen the fishing eagle. It is sometimes found in this country, and it feeds upon fish when it can get any. It is a noble bird, but not so fine a one as the golden eagle, for which it is sometimes mistaken. A lady told me that a flock of wild swans, perfectly white, flew past her drawing-room window in Ireland, pursued by two eagles. It must have been a fine sight. As the swan is a much larger bird than the eagle, it shows the boldness and power of the latter in attacking such a prey.

The heron is a bird you have probably seen, and a most patient one it is, standing, with its long legs, in the shallow water of some pond or stream, for hours together, waiting to catch an eel, or some other fish, or a frog or water-rat. It will also feed on snakes. In frosty weather they go to the marshes, as well as to the sea-shore, in search of food. They build on the highest trees; and, notwithstanding the great length of their wings, they quit the trees and alight on them again with the most perfect silence. In the fine heronry in Windsor Great Park—and it is a royal one—I once saw an interesting sight. A pair of ravens wanted to take possession of a

heron's nest. The battle began on the tree in which the nest was built; but the ravens were driven from it, and then the fight was continued in the air. The ravens soared round and round, uttering their harsh notes, while the herons struck them with their sharp, strong beaks, and after a long time drove them off. In a heronry on the top of some noble Scotch fir-trees in Ashly Park, near Walton-on-Thames, a young heron had fallen out of its nest, and was brought into the house and given to a gentleman who happened to be there. It was put into a basket, which was placed in his gig, and he drove that evening to his house some miles distant. On arriving there, he turned the young bird into his garden, which was walled round. Early the next morning he saw an old heron feeding the young one, and this it continued to do until the latter was able to fly and make its escape. It would appear that this affectionate parent must have fled miles and miles in search of its offspring, until at last, hearing its plaintive cry, it came to its support.

The affection of birds for their young is very extraordinary. I have known a blackbird attack a cat that was near its nest while on the

top of a wall, and by flying rapidly against it drive it away. This affection I have frequently seen in partridges and peewits, or plovers. When they have considered their young to be in danger, they will fly along the ground just before the person who is near their brood, flapping their wings as if they were wounded, and uttering piercing cries, thus drawing the intruder after them. It is a pleasing instance of maternal affection.

I do not know whether any of you remember an extraordinary flight of the small blue or rock-pigeon which took place over Brighton some years ago. I am informed that there was a similar one last year at this place. Where they come from, or where they go to, I am unable to inform you. In North America the flights of these birds are so enormous that they continue in one long, broad line for miles together, and towards evening they settle on trees in the forests, breaking down some of the branches, and many falling on the ground perfectly exhausted. The farmers in the neighbourhood know pretty well the time of this annual migration, and drive their pigs into the woods to feed and fatten on the pigeons.

But I must conclude, or I shall tire you. Let me, however, beg of you not to abandon your snug Fisherman's Home. When the advantages of it are more known, depend upon it a more general and liberal assistance will be afforded it by the inhabitants of this large and prosperous town. Some persons have said to me, "You will do no good amongst these fishermen—they will spend their money in drink and idleness as soon as they get it." Now, I think very differently, and far better, of you. I will never believe that the fine body of men I now see before me are incapable of receiving well-intended and kindly advice, and of acting upon it. I trust and think that this will not be the case.

I will only add, that in walking about Brighton I occasionally see in those vile receptacles for drunkards, called beer-shops, a paper stuck in the window with these words on it—"Best Old Tom here." Now, this Old Tom, as he is called, is a consummate rascal, as I am going to prove to you. You may ask, What has this old gentleman done to deserve such an epithet? You shall hear. If you form a too intimate acquaintance with him, he will lead you to poverty,

misery, and ruin. He will make you impoverish your wives and children, and not only ruin your own health, but ruin also the health of your soul, rendering you at last a fit subject of the devil. But this is not all that this old rascal does. He has been even known to incite those who have been too much under his seductive influence to commit the crime of murder, and many, as they were ascending the fatal scaffold, have attributed their being led to do this from their having begun an acquaintance with Old Tom. Nor is this all. As a Magistrate for Middlesex, I can assure you that very many of those who are brought to our County Lunatic Asylum at Hanwell, in a state of insanity, both men and women, are indebted for their madness to this same Old Tom; for, I am sorry to say, that he has a very extensive acquaintance. What can I say more to you, except to urge and beseech every one to avoid his company and acquaintance, or, in other words, not to become a gin-drinker? From my long experience, I have known good, hard-working men, well to do, fall victims to this sad vice, and become ruined in this world and, it is to be feared, ruined in the next.



I have now done my best to amuse and instruct you. Do not think that what I have said respecting gin-drinkers is intended to apply to you. I see too many open, honest, healthy countenances before me not to feel sure that the vice of gin-drinking has been avoided by them. Farewell.

## IV.

## ON QUADRUPEDS.

MY DEAR FRIENDS,—

I have written three lectures for you, two on the subject of fish and one on birds, and I am now going to address you on the subject of quadrupeds, or four-footed beasts. I have a few anecdotes to tell you respecting them which I hope will interest you, but before I do this, I wish to impress upon you how desirable it is that you should become acquainted with the works of the Great Creator; and, be assured, that the more you acquire a knowledge of them, so much the more will you be led not only to admire but to wonder at the infinite variety and extraordinary contrivances of Him who made you and all things, both in heaven above and

upon and in the earth beneath. If the most minute insect is examined through a magnifying glass, an exquisite and curious formation will be discovered, and will appear as wonderful as that of the largest animal. In short, it is our duty to see God in His works, and those works will declare His goodness.

And now I may tell you that much has been written on the subject of instinct and reason in animals, as well as in men. I will endeavour to explain the difference. Instinct leads all animals to do exactly what was first instilled in them at their creation. Birds build the same sort of nests and feed their young with the food most proper for them—the lion wanders about at night seeking his prey—the ostrich lays its eggs in the hot sand—the bee makes the same sort of curious cells—and so it is through all animated nature; but the dog, the elephant, and some other creatures, will sometimes act as if they were possessed of reason, and of which I will presently give you some instances. Man, on the contrary, is not led to act from instinct, but from reason. If you were going to commit an act of great folly or wickedness, reason would tell you not to do so, while instinct would teach

a bird to avoid a hawk, and a rabbit to get into its hole to escape from a fox. I will now give you an instance of reason in men. You may remember the circumstance, for it only happened a very few years ago. A number of passengers, with many women and children, embarked in a ship, and in which was a company of soldiers. The ship sprung a leak, and it was soon evident that it could not be stopped, but that she must sink. The boats were lowered, but would not possibly hold the whole numbers on board. The brave, noble soldiers, called out that the women and children should be saved first; and they were so, the boats being soon filled with them and the passengers and crew. The soldiers were thus left alone on the deck, drawn up in line, dauntless and unwavering, their captain at their head. They felt the foundering vessel gradually sinking beneath them, but, strong in their sense of duty as well as of discipline, without an effort to save themselves, they went down with the vessel, and all perished; the women, children, and passengers and crew, were saved. Here was the triumph of reason over instinct. Instinct would have led these noble soldiers to seize one of the boats and to save themselves. Reason inter-

posed, and triumphed, as you have seen, over instinct, and that in a way which did the greatest honour to British soldiers.

I will now give you some instances of reason in animals. Two friends of mine went out duck-shooting. When they came near some high reeds where they expected to find ducks, they threw their hats down, crawled to the reeds, and having shot at the birds, they sent their retriever dog for the hats, one of them being much smaller than the other. The dog took up first one hat in his mouth, and then trying to take up the second, the first, of course, dropped on the ground. After some efforts to take them both up at the same time, he put the smaller hat into the larger one, pressed it down with his foot, and then readily brought them both to his masters. This, I think, affords a strong proof of reason.

Another friend of mine was shooting on a hill in the north of England, which was surrounded by a stone wall, about four feet high. He fired at and wounded a hare, which ran through one of the holes left at the bottom of the wall. He sent his retriever after it, who readily leaped the wall from the higher ground, and pursued,



caught, and killed the hare, and returned with it in his mouth to the wall. When there, he made some attempts to leap it, but failed. He then poked the hare through one of the holes with his nose as far as he could, jumped over the wall, went to the hole, and brought the hare to his master.

In Cumberland there are very extensive and high hills, on which numerous flocks of sheep depasture, and which at a distance look like little white specks. A shepherd will stand at the bottom of one of these hills, and send his dog up in the evening to collect his flock. This the dog will do by selecting the sheep from the different flocks, and bringing them down to his master, there being seldom one missing. Should there, however, happen to be one, the dog is sent back, and never fails to return with the proper sheep. I have watched this proceeding, and it has always appeared to me most wonderful that, in a flock consisting probably of some hundreds, mixed with several others, a poor dog should be able to distinguish each one of his master's sheep. A caress on the head, or a kind word, seemed sufficient to repay him for all his trouble. He will return at night to his

master's cottage, wet and tired, and coil himself up before a fire, probably of a few sticks, and be ready to renew his toil the next day.

These sheep-dogs have a wonderful degree of intelligence. When I had a small farm, I was in the habit of having two hundred sheep sent me from the Cheviot Hills, some two hundred and fifty miles from my farm in Surrey. On asking the shepherd who brought them the first year how he had got on, he said he had but a young dog, and found much difficulty by the sheep taking wrong turnings, going up lanes and by-roads. The next year I asked him the same question. He told me that he had been accompanied by the same dog, who recollected all the false turnings the sheep had made the year before, and had gone before them and kept them in the proper road, so that he had no difficulty with them. Here was recollection, intellect, and a certain degree of reason as well as instinct.

The Highland shepherds are firmly convinced that their dogs perfectly understand what is said. Indeed, Hogg, the celebrated Ettrick Shepherd, related to me one or two instances in proof of this, which, I am sorry to say, I have forgotten ;

but you shall hear another. A Highland shepherd, speaking to a gentleman, said accidentally, —“ I’m thinking the coo (cow) is in the corn.” His dog immediately rose, passed out of the house, and climbing to the top of a pigsty, which commanded a view of the corn-field, satisfied himself that the cow was not there, and returned to the house. In order to try the dog, he said, “’Deed, sir, the coo’s in the tatars.” Again the dog went out, made his own observations, and again returned. A third trial was then made, which showed that there was no occasion for the dog’s services. He returned and went under the bed, sulky, growling, and dissatisfied, evidently disgusted at having been made a fool of.

A shepherd was in the habit of taking his little son with him, a boy of three or four years of age, when he was going to attend his sheep. He left him one day on the slope of a hill, while he went to some distance. On his return, he looked and hunted for the lad in every direction, but at last went back, late at night, to his cottage, and told his wife of their loss. While they were sitting together, miserable and disconsolate, they heard a scratching at the door.

On its being opened the shepherd's dog came in, which had not before been missed, and by his significant actions, by pulling the shepherd's coat and looking earnestly at him, induced him to follow the animal with his lantern, and was led by him to some rocks, into which the boy is supposed to have slipped, and thus the life of the child was saved.

I might multiply anecdotes of the sense of dogs to a great extent ; but I will now tell you something of the sagacity of elephants, which, perhaps, have stronger reasoning powers than any other animal.

The father of a young lady who is now staying with me, was one day in a jungle in India tiger-shooting, mounted on the back of a favourite and much-petted elephant. All at once he saw a tiger crouching just beyond the head of the elephant. Having pulled the trigger, his rifle missed fire ; he threw it on the ground in order to seize another, when, to his surprise, the elephant picked up the fallen gun with his trunk and gave it to him, as if aware that it was necessary for the destruction of the tiger.

Another day, this gentleman, while out tiger-shooting on the same elephant, was aware that



a tiger was concealed in a very thick jungle close by, but from which he could not be driven. The mahout, or driver of the elephant, was desired to tell him to bend and beat the bushes with a tree which stood near. This the animal did so effectually, that the tiger started out and was shot. The gentleman was so pleased with the sagacity of his elephant, that he told the mahout to give him some sugar when they returned home—a favourite food with them. This was forgotten; but in the evening the sagacious animal found out his master, rubbed him gently and repeatedly with his trunk, and contrived to do so until the promised sugar was given him.

A third instance of sagacity and reason in the elephant I will now tell you. While on a shooting-party one of these animals got into a morass or bog. Nothing that it could do, or the attendants, could get it out. At last, some one suggested that a quantity of bushes should be thrown to it. These the sensible animal placed under its feet, and thus, by degrees, extricated itself.

An elephant, on one occasion, was ordered to drag a tree, which proved too heavy for its



strength. It was urged and excited to continue the trial, till the poor animal broke the chains which attached it to the tree and ran away. It was supposed that it had escaped into the jungle, and would mix with the wild elephants. But how differently did this noble and sensible creature act! Instead of returning to its native wilds in the forest, it came back in about an hour, accompanied by two other elephants, and their united strength performed the task allotted to the first elephant. Here was reason and a power of communication in animals, which I have referred to in former lectures. You may doubt the accuracy of what I have stated, but I can assure you that the fact may be strictly relied on.

Let me tell you an anecdote of a seal, one of which was lately exhibited in Brighton; and a noble animal it was, and very obedient to its keeper. A gentleman, living near the sea in a remote part of Ireland, where the people are very superstitious, had a seal so tame, so affectionate, and so fond of its master, that it would follow and caress him whenever he had an opportunity of doing so. It so happened that there were two bad harvests in succession, and

the foolish people attributed it to the poor innocent seal. They made such a stir about it that the proprietor was obliged to consent to its being sent away, provided its life was spared. It was placed in a boat, which was rowed to a considerable distance, and the seal then turned into the water; but it soon found its way back to its old master. A second time it was taken to a still farther distance; but again came back. A third time it was taken so far that the boatmen were absent two or three days; but, before they consigned this seal to the waters, they had the cruelty to put out its eyes. One day, the gentleman thought he heard the plaintive cry of his affectionate favourite. On opening his door, there was the seal, who had strength enough left to crawl so far, and then died: thus showing his love to the last. It must have died of starvation, as it was incapable of catching any food.

In the Firth of Forth, in Scotland, seals are very numerous, and will often put up their heads close to a boat. The fishermen, however, declare, that if there should be a gun in the boat no seal will ever come within its range. They are clever, sensible animals, and

easily attracted by musical sounds, putting their heads out of water evidently for the purpose of listening to them. There is a well-known old seal in the Forth, who, from old age, has become perfectly white. The fishermen call him the Laird of Aberdour; and as they have never been able to kill him, they think that he cannot be killed. When a boat approaches the rock on which he is, he rolls himself into the water. The quantity of fish seals destroy is enormous, coming up the rivers after the salmon.

The beaver is another sagacious animal, living in companies, and acting together as if they were possessed of reason. In making their strong dams across the rivers in North America, they will, with their sharp teeth, gnaw through the bottom of a tree, so as to make it fall exactly where they want it. They then fill up the spaces with clay, to form the dam, using their flat tails, as bricklayers use trowels, in plastering it. In the recesses of this dam they lay up their winter store of food.

But I must conclude, with the hope that I may have amused you. I will endeavour to give you one more lecture before I leave Brighton,

and then they shall all be printed, and sold for the benefit of the "Fisherman's Home," which I hope you will all stick to as a place of rational resort, and in the success of which I shall always take the greatest interest.

## V.

## ON INSECTS.

MY DEAR FRIENDS,—

One of our most celebrated poets has said—

“ Each crawling insect holds a rank  
Important in the plan of Him who framed  
This scale of beings ;”

and it is on the subject of these insects that I am now about to address you.

The scale of beings in this world has been so beautifully and wisely ordained by the Great Creator, that one of the greatest of naturalists and philosophers in this or in any other country, while showing me a very small insect through his microscope, made the following remark :—“ I believe that if it were possible to destroy the whole of these insects, the scale of



created beings would become entirely disorganised or disarranged, so completely does the well-being of some depend on the existence of others." This is a curious and interesting remark, coming from such authority, and is well worth your recollection.

There are supposed to be about fifteen thousand different sorts of insects in the world ; and many of them, if viewed through a microscope, would surprise you by the beauty and richness of their colours. Some have fins, like a fish ; or a beak, resembling that of birds. Others have horns, like a bull or a stag. One is armed with tusks, not unlike those of an elephant ; another has spines, like the quills of the porcupine or hedgehog ; and some are covered with a substance like horn.

But perhaps the most interesting fact is, that there is no one invention of man up to the present time of which some hint may not have been taken from insects. You know that steamboats are made to pass along the water by means of a wheel on each side of the vessel. Well, there is an insect which moves itself in the water by the assistance of two little wheels fixed to its sides, which it turns round with great quick-

ness, and thus goes from one place to another. Spiders may teach the art of weaving, and the bee that of building. One insect has an instrument like a saw; and another like an auger, or a carpenter's tool, to bore holes with. The nautilus, which may almost be called a sea-insect, spreads out a little sail, and guides itself with oars. In short, there is no creature, however insignificant it may appear, from which some benefit or instruction may not be derived.

You will, perhaps, be surprised when I tell you that many of the little insects you see around you have a great degree of sense, though you, probably, avoid them with dislike. But so it is, and I will give you one or two instances of it. You know that bees are kept in hives, where they lay up a store of honey, and they go in and out of the hive through a hole left open at the bottom of it. Now, a large slimy slug, which has no shell, got into a hive through this hole. The bees soon killed it; but their united strength could not drag it out of the hive, and therefore they covered it completely over with a thick coating of coarse wax, called *propolis*. It so happened that one of the common brown-shelled

snails got into the same hive. It was soon stung to death; but, instead of covering it and its shell over with wax, they merely glued the edge of the latter to the board of the hive, and thus left it, as no unpleasant smell could issue from it, which would not have been the case with the slug had it not been cased over with wax. Was there not reason in this?

I had a hive of bees which was attacked by wasps, who wanted to get at their honey. In order to defend the entrance to the hive, they made a sort of fortification of wax behind the hole of entrance, leaving only two or three small passages just sufficient to enable one bee to pass at a time, so that they could defend themselves against the wasps with great ease.

When the heat on the inside of a hive is so great that the wax is in danger of melting, a number of bees will collect at the bottom of the hive, and move their little wings with such rapidity, that they can create as great a circulation of air as a lady would do in fanning herself.

In very hot countries, such as the West Indies, bees alter their mode of laying up their store of honey. If they placed it in cells at the top of

the hive, as they do in colder countries, the great heat of the sun would melt the wax, and all their fanning would be to no purpose. They therefore place it in very small waxen bottles, somewhat in shape of an inverted mushroom, the stalk or neck being uppermost. These are placed at the bottom of the hive, and in this situation the wax is kept cooler, and, of course, less liable to suffer from heat.

I think that these facts will show you that bees are possessed of sense, or what some would call a superior intellect. It is not, however, only their sense which we should admire, but also their industry and usefulness. They are never idle, but work from morning to night in collecting honey; and when the weather is bad they employ themselves in cleaning the hive, and in making and repairing their cells. These cells are beautifully constructed; and, as the bees are obliged to pass over them very frequently, the edges of them are much stronger and thicker than the walls of the cells. These edges, however, serve another purpose, as they help to retain the honey. When the cells are filled, they are covered over with wax, and not opened until the honey is wanted.

Ants are another class of insects whose operations are curious and wonderful. For instance, there is a small red ant in the West Indies which conceals itself in covered ways, and attacks and feeds on the hardest woods, never appearing on the bark, or even touching it. Thus, when a tree or a beam of a house appears perfectly sound, it has been, perhaps, eaten out, and nothing but a shell remains.

Some of our English ants will ascend a poplar or a lime-tree, where they find, on the tender shoots of the tree, a small green insect called an aphid. You may ask, "Do they eat these insects?" Quite the contrary. The ants, as I have often seen them do, tickle them with their antennæ, or little feelers, which project from their heads. This seems to please the aphides, who discharge a sweet substance from their bodies, called honey-dew, on which the ants feed. They may be called the milch-cows of the ants.

In a fine morning, ants disperse themselves in various directions and to considerable distances from their usual abodes in search of food. When they have discovered any, they make their companions acquainted with it by means of their an-



tennæ, or feelers, which serve them, as I will presently prove to you, to hold a sort of conversation with each other. You may be surprised at hearing this; but it is perfectly true, not only with respect to ants, but also with bees and wasps, and probably, also, in regard to other insects. I have frequently placed a small green caterpillar near an ants' nest, and watched what would take place. A solitary ant has, perhaps, discovered it, and eagerly attempted to draw it away, as a winter store—for they lay up, as prudent persons should do, against a rainy day. Not being able to accomplish this, I have seen it go up to another ant, and by means of the antennal language bring it to the caterpillar. Still, these two were not able to accomplish the task. They separated, and brought up reinforcements of their community by the same means, until a sufficient number were collected to enable them to drag the caterpillar to their nest. You thus see that a sort of language can be kept up by means of these antennæ. It is supposed that a strong hive of bees will contain 36,000 workers. Now, each one of these, in order to be aware of the presence of their queen,—whom they love, as I am sure you do

yours,—touch her every day with their antennæ. Should the queen die, or be removed, such is the affection of her subjects for her, that the whole colony disperse themselves, and are seen in the hive no more—perishing, every one of them, and quitting all their store of honey which they had laboured so industriously to collect. On the contrary, should the queen be put into a very small wire cage, placed at the bottom of the hive, so that her subjects could touch and feed her, they are perfectly contented, and the business of the hive proceeds as usual.

You see, then, that this antennal language is a wonderful and curious gift, bestowed by a Benevolent Creator on little insects; but who are all, like you, objects of His love and care. You should always bear this in mind; for, if God clothes the flowers of the field, and feeds the young ravens that call upon Him, be sure that He will both clothe and feed you if you trust in him, and endeavour to do what is pleasing to Him.

There is another class of insect, the common house-fly, well worth your notice. On examining them, you will see that each has two pro-

jecting eyes, both of which are furnished with 4000 lenses, appearing, through a microscope, like a piece of honeycomb. These give them that rapidity of motion which you must often have observed in escaping capture. Their flight, also, is so swift that it has been supposed they can fly at the rate of nearly a mile in a minute. Their interior structure is equally curious, having blood-vessels and other functions which are to be found in larger animals. But I must draw your attention to their feet, which are furnished with a sort of wet sponge, that enables them to run up and down smooth surfaces, such as glass, with the greatest facility. Some flies lay their eggs in dung-pits; others in the bark of trees, which causes them to throw out those gnarled and wooden projections which you may sometimes see in old oak and elm-trees.

Wasps are another species of insects whose proceedings are very curious and interesting. Early in the spring, and on a sunny day, you may see a large wasp settling on some decayed wood and appearing to feed on it. This is a female wasp, the parent of a large colony. The wood she seems to eat is formed into a few cells,

perhaps at first only five or six, in which she deposits her eggs. These are gradually increased in number until the eggs are turned into wasps, which then come out and assist in the work of building, until what may be called a large city is formed, inhabited by some thousands of her subjects,—for the queen is the mother of them all. She generally selects a hole in a bank, some old hollow tree, or a roof of a house, in which to make her future colony. There are, however, two distinct species of wasps in this country; one of which forms her nest, generally a smaller one, on the boughs of fir and other trees. They are round, and are covered with what may be called flakes, of a substance made also from wood. These throw off the rain, and also serve to keep the young wasps warm before they arrive at maturity. The other species of wasps make the same covering.

In order to show you with what rapidity these insects form their nests, I will mention the following fact:—I built a small shed early one spring, which was covered over with slates. In the course of the following autumn it was found that the slates admitted the rain. Some



of them were, in consequence, taken off, when a wasps' nest was found built on the rafters, so that it could readily be removed perfectly entire. It was a beautiful structure, the outside appearing as if covered with small brown shells, and it measured  $3\frac{1}{2}$  ft. in circumference. I sent it to the Zoological Museum. Now, this large nest must have been made in the course of five or six months.

The nests of hornets are equally curious; but they use green wood in forming them. They are generally found in hollow trees, but sometimes on the branches of firs; so that, probably, like the wasps, there are two species. They are a dangerous insect, as their sting is very severe. They are also very strong. I once placed a hornet under a common wine glass, when it got its fore feet under the edge of the glass, and thus lifted it up, and made its escape. I also once saw a hornet carry away a small pear from my garden. Like wasps, the female hornet is the parent of the colony. She remains torpid during the winter, and in the spring leaves her retreat, and begins making her nest. All the workers, both those of the wasps and hornets, die in the winter. This is



a beautiful arrangement of Providence, or, rather, I should say, of the Great Creator; for if these insects increased and multiplied in the same proportion as bees, we should experience a most unbearable nuisance. Bees, on the contrary, increase; are confined in hives; and are most beneficial to mankind in producing wax and honey. I had, however, almost forgotten to tell you that there is a winged ant in South America which builds a curious and beautiful nest in trees. The cells of the combs are hexagonal, like those of bees, and are stocked with honey, which is both good and sweet. The cells are much smaller than those of bees, and the whole arrangement of them shows the most interesting specimen I have seen of insect architecture. I have brought a piece of their comb to show you.

The large forests in South America would be almost impassable, both for man and beast, if it were not for the beetles. The trees which compose them stand very thick, and as they and the branches are constantly falling down, they are quickly consumed by beetles, which abound in these forests in incredible numbers. Ants also assist in the destruction of the trees, so that the

forest can be travelled through without many impediments. But for these useful insects, no one could get through them.

The nests of many insects, as I have mentioned, are very curious and interesting. I have brought two or three specimens of them to show you. One is that of a moth, found in South America. You will see with what labour and wonderful skill it is formed, and how impossible it seems for an insect, shaped as a moth, to introduce these numerous bits of sticks and fix them on the outside of its nest. Here are some other specimens I have brought to show you.

But I must not forget to tell you of a little creature which lives far out at sea, and is found on the gulf-weed. Its name is *latiopa*. Sometimes a rough wave will sweep it from the weed and force it into the deep waters; but it is provided with an air-bubble, and it glues to this bubble a thread, which it lengthens as the bubble naturally rises to the surface. This small quantity of air, before it bursts, floats on the water, and is soon attracted by the gulf-weed, towards which it runs and fastens itself alongside. Then up comes the insect, by means of her thread, and thus regains her seat on the

weed,—her natural position. You see how wonderfully and kindly the Great Creator has provided for the well-being of a little insignificant creature.

There are, no doubt, many curious and interesting insects in the sea; but, from the element in which they live, we know but little of their habits and peculiar instincts. Some are parasitic, or adhere to the bodies of fish, and others eat into the flesh of whales. I must, however, refer to the mussels, which, as you are aware, attach themselves to rocks, by means of a strong silk-like thread; but perhaps you are not aware that these threads, which are very strong, have been collected and made into a pair of gloves.

I have deferred my mention of the most interesting and valuable of insects for the conclusion of my lecture. I refer to the silk-worm. In order the better to enable you to understand the wonderful arrangements of Providence in regard to this moth, I may tell you that all butterflies and moths, when they quit their cocoons, or winter-coverings, fly away, and are of no service to man, except as objects of admiration of their beauty and peculiar instincts. But how

different is the case of the silk-worm ! If she were furnished with expanding wings, like other moths, she would fly away and become useless. Her wings, however, are so short, that although she flutters them a little, she never attempts to quit her home which has been provided for her, but lays her eggs and dies—so short is her existence as a perfect insect. These eggs, when hatched, produce very small grubs, which must have mulberry leaves provided for them to feed upon. When they have arrived at maturity they leave off eating, and begin to spin their valuable silk, forming it into a cocoon, or covering, which they may be heard doing night and day, for three days, when it is finished. The silk which covers the cocoon will extend for many hundred yards. In the silk countries—that is, in places where the silk-worms are most cultivated—these cocoons are thrown into a cauldron of hot water ; the ends of the silk unfasten, when 50 or 60 of them are caught and wound off into hanks, or skeins, like worsted, all together, and sold by weight to silk merchants. The grubs which spin these cocoons, of course, are killed ; but a certain number are reserved for breeding, and these lay many eggs.



Now, let us consider the utility of the silkworm. The countries which produce the greatest quantity of silk are Italy, Turkey, India, and China. The number of persons in the world who are benefited or clothed by silk is perfectly enormous. There are the growers of it, the feeders, the cultivators of mulberry-trees, the manufacturers of silk, the shopkeepers and their attendants, and many others who are either directly or indirectly benefited by it; and all this is owing to the peculiar construction of an apparently insignificant insect. And here I may mention that no fishermen's knots are found in winding off the silk, and no entanglement or breakage, but all runs smoothly from one end to the other. Let us wonder at and admire this wonderful arrangement of a Benevolent Creator in forming this insect.

But I must conclude this, my last lecture—at least, for the present—with every kind wish for your happiness and prosperity. Do not forget your old friend, but try and make a good use of what he has said to and written for you, and God bless you all!



## VI.

THE LOVE OF ANIMALS FOR MAN  
AND FOR EACH OTHER.

MY DEAR FRIENDS,—

Some of you asked me to read you another lecture, and I am going to give you one on the love of animals for man and for each other. It is an interesting subject, and may, perhaps, induce those who either read or hear it to treat dumb animals with that kindness which every one who has a good heart would wish to do.

When that fearful curse was pronounced upon man, "the fear of you and the dread of you shall be upon every beast of the field and fowl of the air," leading creatures to avoid mankind as their worst enemies, one exception seems to have been made in the case of the dog. This faithful animal cleaves to his master through

poverty, distress, hunger, and even death itself. Nothing destroys his love and attachment. We have instances when officers have been killed in battle, a loving dog has remained close to the body of his master, howling his distress, refusing all food and comfort, following the body to the grave, and expiring upon it,—thus showing his affection to the last.

Another affecting instance is related of a dog, who followed his master to his grave, which was in one of the London churchyards, and was overlooked by several houses. On this grave the dog scratched a hole and lay in it. One of the kind-hearted inhabitants of the houses brought it some food; but there it remained day after day, but eating what was brought it. At last, some one erected a small shed over it, to shelter it from the weather. There the dog might be seen year after year, protected and sympathised with by every one who knew the circumstance of its remarkable attachment, till death—and nothing but death—released it from its fidelity to the master it loved.

But, before I proceed with my anecdotes of these affectionate animals, I must express my surprise that so many unfeeling allusions should

constantly be made to those noble creatures. Thus we hear of a “lazy dog”—a “drunken dog”—a “dirty dog”—a “shabby dog”—of leading a “dog’s life”—of a “dogged temper.” We call a dandy a “puppy,” and sometimes another man a “cur.” All these are epithets misapplied as far as the dog is concerned; and I think you will agree with me when you hear the following anecdote:—

A young gentleman of the name of Gough, of considerable talents and of an amiable disposition, lost his way when wandering, without a guide, on the mountain Hellvellyn, in Cumberland. He was accompanied by a terrier bitch, his constant attendant during frequent solitary rambles through the wilds of Westmoreland and Cumberland. Trying to reach the top of the mountain by a difficult pass, he fell down a precipice called “Stridenedge,” and was killed. His remains were not discovered until three months afterwards, when they were found guarded by his faithful dog. Although the body had been so long a time exposed to the attacks of the numerous wild birds of prey, and also the foxes which abound in that region, it was found untouched and undefaced by them, so strictly had

it been watched over and protected. How the dog procured his food is a mystery which has never been discovered, but the fact of his remaining near the body of his master is undoubted. The celebrated Sir Walter Scott, a great lover of dogs, and who frequently visited a friend in Cumberland, wrote a beautiful poem, called "Hellvellyn," on the incident I have just related. It is too long to quote the whole of it, but I will give you an extract from it. Sir Walter Scott says he had seen the place where the wanderer had died, and then adds:—

"Dark green was the spot mid the brown mountain-heather,

Where the Pilgrim of Nature lay stretch'd in decay,  
Like the corpse of an outcast abandon'd to weather,  
'Till the mountain-winds wasted the tenantless  
clay;

Nor yet quite deserted, though lonely extended,  
For, faithful in death, his mute fav'rite attended,  
The much-lov'd remains of her master defended,  
And chased the hill-fox and the raven away.

How long didst thou think that his silence was  
slumber?

When the wind wav'd his garment, how oft didst  
thou start?

How many long days and long weeks didst thou  
slumber,

Ere he faded before thee, the friend of thy heart?

And, oh! was it meet that — no requiem read o'er  
him,

No mother to weep, no friend to deplore him,

And thou, little guardian, alone stretched before  
him —

Unheeded the Pilgrim from life should depart?"

I am sure you will all thank me for relating this beautiful and affecting anecdote of the love and fidelity of a poor dumb animal to his master, whose remains were interred in the burial-ground attached to a Quakers' meeting-house, near the foot of the mountain.

A poor woman, returning one winter's evening from a market, where she had purchased her loaf of bread, a bit of bacon, and a small piece of mutton, and accompanied by a small dog, was overtaken by a violent snow-storm, as she was passing along a narrow lane. She was unable to proceed, and at the end of three or four days was found dead. Her dog had survived, and was discovered close to his mistress and the basket of food, which was untouched, although the poor animal must have been nearly starved from having had nothing to eat for so long a time.

I will now relate another anecdote of the love and affection in dumb animals, which I am sure



will please you. Mr. Morritt, well known to the readers of the life of the celebrated Sir Walter Scott, as his intimate and confidential friend, had two terriers of the pepper-and-mustard breed, or, rather, for it is a character I always delight in, the Dandy Dinmont breed. These dogs,—for it is as well to leave out the feminine appellation,—were much attached to their kind-hearted master, and he to them. They were mother and daughter, and each produced a litter of puppies about the same time. Mr. Morritt was seriously ill at this period, and confined to his bed. Fond as these dogs were of their puppies, they had an equal affection for their master, and they accordingly showed this in the following manner. They conveyed their two litters of puppies to one place, and while one of the mothers remained to suckle and take care of them, the other went into Mr. Morritt's bedroom, and continued there from morning until evening. When the evening arrived, she went and relieved the other dog, who then came into the bedroom, and remained quietly all night by the side of the bed; and this they continued to do, day after day in succession, until Mr. Morritt recovered. This charming anecdote was com-

municated to me from a quarter which need not leave a doubt of its authenticity, and affords an affecting proof of love and gratitude in animals who, I am sorry to say, are too often ill-treated.

A vessel was driven by a storm on the beach of Lydd, in Kent, a place some of you are probably acquainted with. The surf was rolling furiously, and eight men were calling for help; but not a boat could be got off to their assistance; although I have no doubt but that some of you now present would have tried, for the Brighton fishermen have done many brave things. However, a gentleman at length came on the beach, accompanied by his Newfoundland dog. He directed the attention of the noble animal to the vessel, and put a short stick into his mouth. The dog at once understood his meaning, and sprang into the sea, fighting his way through the foaming waves. He could not, however, get close enough to the vessel to deliver the stick he was charged with, but the crew joyfully made fast a rope to another piece of wood and threw it towards him. The sagacious dog saw the whole business in an instant—he dropped his own piece, and immediately seized that which

had been cast to him, and then, with a degree of strength and determination almost incredible, he dragged it through the surge and delivered it to his master. In this way a line of communication was formed, and every man on board saved. Does not this anecdote make you love dogs? It ought to do so.

I will now give you an instance or two of the love and kindness of animals to each other. My home is at East Sheen, in Surrey; but a short distance from it there resides an amiable and excellent gentleman, who, like many others, has his cows, pigs, and poultry, and one of his pigs produced a large litter. As is generally the case, the youngest of the litter was a small, weakly pig, and was pushed away when he attempted to feed with the others. Being thus without food, he gave utterance to his plaintive, feeble cries. These attracted the sympathy of a kind-hearted hen in the yard, who sheltered and warmed it under her wings. The pig was subsequently fed by artificial means, but the hen continued her care of it till it no longer required her protection.

I will give you another instance of animal

kindness which occurred under my own observation. The late Earl of Albemarle, when Master of the Horse to the Queen, lived at the Stud House in Hampton Court Park. He had a fine breed of black-and-tan spaniels, one of which produced a litter of puppies and died in bringing them forth. Their plaintive cries, like those of the pig I have mentioned, induced a young female of the same breed, who never had puppies of her own, or was in the way of having any, to foster and warm them. They attempted to suckle her; milk came in consequence, and she was thus enabled to bring them all up. I have often seen her employed at her task, and nothing could exceed the affectionate way in which she performed it.

You shall hear of an instance of friendship in animals. When the German Legion was actively engaged in the Peninsular War, two horses were always picketed together and served side by side in the same troop. One of these horses at last died. His companion refused all food, and pined away and expired—a victim to his affection for his constant companion. Birds, also, that have been kept together in cages, have



been known to die when they have lost a companion : so capable are animals of showing love and affection.

But let me return to the dog ; for I like to dwell on his noble qualities. It was a pleasing remark of Sir Edwin Landseer, whose pictures of dogs approach so near to the life, that the Newfoundland dog was “ a distinguished member of the Humane Society.” Indeed, we see in Sir Edwin’s pictures faithfully portrayed honesty, fidelity, courage, and sense—no exaggeration—no flattery. He makes us feel that his dogs will love us without selfishness, and defend us at the risk of their own lives ; that though friends may forsake us, they never will ; and that in misfortune, poverty, and death, their affection will be unchanged and their gratitude unceasing.

A gentleman, while bathing in the sea near Portsmouth, was in the greatest danger of being drowned. Assistance was loudly called for ; but no boat was ready, and, although many persons were looking on, no one could be found to go to his help. In this predicament a Newfoundland dog rushed of his own accord into the sea, and was the means of saving the life of



the gentleman. He afterwards purchased the dog for a large sum, treated it as long as he lived with great kindness, and had the following words worked on his table-cloths and napkins—" *Virum extuli mari* ;" which may be thus translated—"I have rescued a man from the sea."

You will be amused with the following anecdote, for it is something in your way as sailors. There was a Newfoundland dog on board H.M.S. Bellona, which not only kept the deck at the bloody battle of Copenhagen, but ran backwards and forwards with so much courage and apparent anger at the foes, that he became a greater favourite than ever with the crew. When the ship was paid off, after the Peace of Amiens, the sailors had a parting dinner on shore. Victor, the dog, was placed in the chair, and fed with roast beef and plum-pudding, his health drank, and the bill made out in Victor's name.

A kitten, only a few days old, had been put into a pail of water in the stable-yard of an inn for the purpose of drowning it. It had remained there for a minute or two, until it was to all appearance dead, when a female terrier, attached to the stables, took the kitten from the water and carried it off in her mouth. She suckled and

watched over it with great care, and it lived and thrived. She had at the time a puppy of her own.

I will now tell you something of the turnspit. In my very young days I was at a school where large joints of meat were turned by two of these dogs, one on one day and the other on the next. When you consider that a joint of beef would take at least three hours to roast, you may suppose that the poor dogs had no easy task to perform. The consequence was that, as the dinner-hour drew near, they would often hide themselves, and I have been told that if one of them was found, and it was not his turn to be put into the wheel, he would point out the retreat of his companion, showing that they not only calculated time, but are clever, sensible dogs.

Dogs have been known to die from excess of joy at seeing their masters after a long absence. An English officer had a large dog, which he left with his family in England while he accompanied an expedition to America during the wars of the colonies. Throughout his absence the animal appeared very much dejected. When the officer returned home, the dog, who hap-

pened to be lying at the door of an apartment into which his master was about to enter, immediately recognised him, leaped upon his neck, licked his face, and, in a few minutes, fell dead at his feet. A favourite spaniel of a lady recently died on seeing his beloved mistress after a long absence.

I have now given you some anecdotes of the affection, sense, and strong attachment of animals either to man or to each other, especially of the dog. I am convinced that, the more the character of this animal is known, the better treatment he will receive, and a stronger sympathy will be excited for him. In fact, he is a friend so faithful — a protector so disinterested and courageous — that he deserves all the kindness and affection which can be shown him. A French writer has boldly affirmed that, with the exception of women, there is nothing on earth so agreeable, or so necessary to the comfort of man, as a dog. However this may be, it is certain that if we were deprived of the companionship and the services of the dog, man would be a solitary, and, in many respects, a helpless being. The dog has died in defence of his master — saved him from drowning — warned

him of approaching danger, and, if deprived of sight, has gently and faithfully led him about. If his master wants amusement in the fields or the woods, he is delighted to have an opportunity of procuring it for him. If he finds himself in solitude, his dog will be a cheerful companion; and maybe, when death comes, he will be the last, as we have seen, to forsake the grave of his beloved master. In fact, he is fond, intelligent, and grateful. I will here quote some lines by Lord Byron on his dog:—

“When some proud son of man returns to earth,  
Unknown to glory but upheld by birth,  
The sculptor’s art exhausts the pomp of wo,  
And storied urns record who rests below:  
Not what he was, but what he should have been.  
But the poor dog, in life the firmest friend,  
The first to welcome, foremost to defend,  
Whose honest heart is still his master’s own,  
Who labours, fights, lives, breathes, for him alone,  
Unhonour’d falls.           \*           \*           \*

Ye who perchance behold this simple urn,  
Pass on—it honours none you wish to mourn;  
To mark a friend’s remains these stones arise—  
I knew but one, and here he lies.”

I have now done with my lectures for the present. You wished, when I last met you, to

have one more, and I need not tell you that this has been a hurried one. I have only to say that I quit you with much regret; for I have been listened to with kindness and attention, and, what has gratified me much more, I have been assured that I have both pleased and instructed you. Be quite certain that I shall never forget you, or cease to feel a deep interest in your welfare. Do not forsake your "Home." It is a place for rational enjoyment and improvement, equally a place also for an honest, sober man, as well as a Christian. And now farewell.



## VII.

THE INFLUENCE OF ANIMAL LIFE  
ON LIME.

MY DEAR FRIENDS,—

I propose in this lecture to talk to you a little on those sea-flowers, which, on a calm sunny day, you have seen floating about, expanding their beautiful colours, and unfolding their living petals to entrap their food. I propose also to notice sponges, corallines, and other marine productions, and to point out to you the use which Divine Wisdom intended they should be of to you fishermen when He created them. You may ask, How can these apparently almost inanimate substances be of use to us? I will endeavour to explain this as intelligibly and plainly as I can, but at the same time expressing my belief that without them your occupation as fishermen would be a useless one—

that is, that you would not be able to take fish in your nets.

Now the sea, as you know, consists of a vast expanse of water, and Providence has many methods of keeping it in a pure and wholesome state. It is impregnated with salt—the winds blow over and agitate it; and now let us see the effect of a storm upon it. The sun is obscured, and the breeze freshens from the sea—dark clouds are gathering on the horizon, and the tide begins to turn. The heaving waves now tumble towards the shore, and, as they break in angry foam, portend a storm. The sky looks threatening, and the thunder peals in the distance. The sea appears to wake as from a slumber, and the blackening heavens lower over its dark bosom, while the rising blast, impelling all her waves, drives them upon the rocks in sheets of white foam, lashing them on as if to madness, till at length ocean and sky seem mingled, and all is violence, and roar, and rage.

Such are the changing aspects of the sea, and such the efficient means whereby Nature insures her renovation of the mighty deep, refreshing it throughout its broad domains, and keeping its waters wholesome, filled with air, and thus

adapted to afford the means of respiration to the numberless living things that flourish in its vast space.

But there is another operating cause, which I have already hinted at, and most wonderful it is, in rendering the waters of the sea conducive to the well-being of the animals which are to be found in it, and which I will now do my best to explain to you. You are aware that all rivers discharge themselves into the sea, and these waters have a strong impregnation of lime, which is obnoxious to animal life. Now, let us see how this is obviated. It is a curious and interesting fact, and I have the authority of the first naturalist and philosopher of this, or, perhaps, any other country (Professor Owen), for what I am going to tell you. You have all of you probably heard of the coral insect—a very small one, indeed. By the agency of these coral animalculæ, two hurtful influences of the caustic lime are neutralized. These animalculæ absorb the lime which is in solution, combine it with a substance called carbonic acid, and thus form what is called carbonate of lime, which is insoluble, and perfectly innocuous, or not detrimental to animal life. By thus forming and precipi-

tating, or forming at the bottom as a sediment, this earthy matter, they are enabled to build up the cells in which they live, and by which their soft, jelly-like substance is defended. These cells form what is called the coral or madrepore, and the quantity of caustic lime thus removed from its state of solution in sea-water, and thrown down or precipitated as an insoluble earth, or earth gathering a crust, may be conceived when I tell you that islands and reefs of coral, upwards of one thousand miles in extent, are formed by the agency of these seemingly frail and insignificant living beings.

I have said that these insects form islands, and, before I proceed further to show you the object of animal life in removing the caustic lime from the sea, I will tell you how this is performed. The operations of the coral insect, through a long succession of ages, proceed upwards from the original foundations, until the surface of the sea is reached, when the work ceases. Sea-birds settle on these rocks of coral, sea-weeds are driven on them, and other substances, all of which, added to the manure of birds, form a stratum of soil, on which seeds are either dropped or washed by the tide, and thus



take root and flourish, so that in time an island is formed, covered with cocoa-palms and other exotic trees. This is the case about the Bermudas, where nothing can exceed the beauty of these coral islands.

When you consider that, in addition to these, there are coral reefs, some of which extend upwards of one thousand miles, it would appear certain that the operations of these little insects must have existed from the earliest periods of this our globe. It is a wonderful fact to reflect upon, and will show how Providence arranges beneficially for the good of His creatures a system which it would never have entered into the mind of a finite being to conceive as possible, until more recent discoveries have proved that such is the case. Barrier reefs are similar to coral islands. They run parallel with the shores of some larger island or continent, separated, however, from the mainland by a broad and deep lagoon channel. The prodigious extent of the combined and ceaseless labours of these little world-architects, as they may be called, must be witnessed in order to be properly conceived. For instance, they have built up a barrier reef along the shores of New Caledonia for a length



of four hundred miles, and another which runs along the north-east coast of Australia one thousand miles in extent. Now, supposing this latter to be only a quarter of a mile in breadth and one hundred and fifty feet deep, here is a work compared with which the walls of Babylon, the Great Wall of China, or the Pyramids of Egypt, may be called children's toys. You must recollect also that the operations of the coral insect were carried on amidst the waves of the ocean, and in defiance of its storms, which, as you know, often sweep away the solid works of man.

Such are some of the operations of that extraordinary insect, the coral ; and I have pointed out their influence on the caustic lime which finds its way into the sea, and which is so injurious to animal life. But there are other means provided for neutralizing and rendering the lime harmless. Sponges, sea-flowers of various descriptions and in innumerable quantities, and other marine animals, all having life, act as agents in this wise arrangement of Providence to purify the waters of the ocean. Sponges, you might suppose, have no vitality or living organs ; but this is not the case, although they perhaps are the lowest in the scale of living beings, as I

will show you. The sponge, as you know, not having the power of moving from place to place, is fixed and motionless as the rock on which it grows. Now, as the sponge is productive, that is, that it propagates other sponges, it may be asked by what means this is done? The parent sponge produces a large quantity of seeds, called gemmules, which may be compared to very small pins' heads. If these are put in a watch-glass containing a little sea-water, it may be seen by the naked eye that they are able to swim about with great facility and quickness. On examining them with a good microscope, the way in which they move will be discovered, and certainly a wonderful sight it is. Millions of what may be called paddles, and all furiously at work, cover the surface of these tiny atoms, and all so rapid in their motion that it is almost impossible to perceive their shape. These living seeds are washed out of the body of the parent sponge by the currents of the sea, and in process of time fix themselves on the rocks and there grow into sponges, and fulfil at last the purposes for which nature intended them, that of neutralizing the effect of caustic lime; and if this were not done, very few fish would be taken by you

fishermen. You see, then, how wonderfully Providence, or rather an Almighty Being, has arranged everything, not only for the good of His creatures, but for mankind generally; and this by the means, in some cases, of little insignificant insects. And here let me ask you to pause for one moment in order to contemplate the amazing power and wonderful goodness of Him who made the earth and the sea, and stored them both with what is useful and beneficial to us. Then look at the sun, the moon, the stars, and the glorious expanse of the heavens, and see what power is displayed in them! Gladly would I call upon you to look up with reverence to that Great Being who is so good, so wise, so considerate to all His creatures, and to pray to and love Him as He directs us to do. Great God! what sacrifice is too great to offer Thee? what love too devoted? Indeed, His love to us—His goodness to us—His care of us, all demand this tribute from us, and hard and insensible must our hearts be if we do not show it.

But to return to the benefits which are derived from the innumerable small creatures which are found in the sea. Independently of what has been stated of their removing the

noxious influence of caustic lime, they are also agents in the hands of the Almighty for other purposes. Take up a handful of the sand cast up by the retreating tide upon the adjoining beach, and with a magnifying glass examine it minutely; count the various objects you will see there, and if you have sufficient patience, count their numbers also: but it will be no easy task. You will see how innumerable are the forms in which very small shells will present themselves, all of them delicate in their structure and elegant in their shape, and inhabited by exquisitely-formed creatures, having all the functions of those found in larger shells. Monsieur D'Orbigny, a great observer of these minute shells, reckoned 3,840,000 in one ounce of sand! If we attempt to calculate the contents of a square yard, the amount would surpass all human conception. So incredible are their numbers that they form banks, which, by their accumulation, interrupt the progress of ships, stop up bays and straits of the sea, fill up harbours, and with corals produce those islands that rise up in the Pacific Ocean. But do not start when I tell you that these almost invisible living objects have been employed in building up the very world on



which we tread. I should be sorry to state anything to you without some proof of what I said. It is easy, therefore, to show you that these almost invisible shells have had to do with the construction of the surface of the earth. Take, for example, the neighbourhood of Paris. The chalky substance about it is in some places so filled with these shells, that a square inch from one of the quarries contains something like 58,000 of them, and that in beds of great thickness and of vast extent. This would give an average of many millions of millions in the square yard. Now, as all Paris and the towns and villages of the neighbouring districts are built of the stone quarried from this deposit, it is evident, without any exaggeration, that the capital of France and all the neighbouring towns are constructed principally of these little shells. Indeed, the chalk of our own dear country, "the white cliffs of Albion," which you all so well know, and which throughout is of such vast thickness, contains myriads upon myriads of these interesting shells.

But I shall tire you if I proceed further on this subject. Be quite sure that I have the authority of some of our best naturalists for



what I have stated; but your own eyes and examinations may help to convince you that at least a part of what I have said is true. One of my objects has been to amuse you—the other to raise your thoughts to that stupendous Power, who, apparently by small means, works such great ends, and who is at the same time infinitely good, wise, and loving to every one. In this world you are always in danger of foundering amidst the waves of sin, or of being shipwrecked on the rocks of temptation; but, like wary pilots, steer your boats into some well-sheltered creek till the storms of this world are blown over, and enjoy a safe anchorage. Then hoist your flag of hope, ride before the sweet gale of redeeming love, till you make, with all the sails of humble faith, the blessed port of eternal life and happiness.

## VIII.

ON

## INSECTS AND MARINE ANIMALS.

MY DEAR FRIENDS,—

You were pleased with my lecture on Insects last spring, and I am now going to pursue the subject; for it is almost an endless one. In fact, the works of nature, or, I should say, of the great Creator, far exceed what we know, or, indeed, are ever likely to know of them. My lecture, however, will not be confined to insects; but I propose also to bring under your notice some of those marine animals which so many of you must have seen, but, probably, have not been acquainted with their peculiar habits.

I will first describe to you the cochineal insect, because, with the exception perhaps of indigo, it produces the most important of all materials for

the dyers, and because I omitted to mention it in my first lecture on Insects. The cochineal is extensively cultivated in Mexico, and when the Spaniards conquered that country in 1518, they found the fine dye procured from this insect, but supposed for a long time afterwards that it came from a very small seed; for such they thought it to be in consequence of its singular appearance. It was only from its being examined under a microscope that its true nature was ascertained. The insect, when imported into this country to be used as a dye, has the appearance of a reddish shrivelled grain covered with white powder. It feeds on what is called the Indian fig, a species of cactus, commonly called the prickly pear; but in Mexico, where the cochineal is most cultivated, the hopal. In that country, plantations of the hopal may be seen in lines of fifty or sixty thousand, each plant being kept about four feet high for more easy access in collecting the insect. Great care is required in this operation, which is performed by the Indian women with a squirrel's or stag's tail. When the insects have been collected they are killed, either by throwing them into boiling water or by placing them in ovens; and these latter bear a higher

price in the market, as they are less subject to adulteration, a whitish powder being preserved on them. The quantity of these insects imported from South America for the purpose of procuring a beautiful red dye amounts to upwards of half-a-million of pounds sterling,—a great sum to be derived from so small an insect, and which should show us the folly of despising any animal on account of its apparent insignificance and minuteness. The Spanish Government have always been extremely jealous of any interference with their trade in this insect: the East India Company offered a reward of 5000*l.* to any one who should introduce it into India; but the experiment has, I believe, hitherto failed.

Another insect possesses that valuable material called lac, and is a species of cochineal. It is found on various trees in the East Indies, and the substance is made use of in that country in the manufacture of beads, rings, and other female ornaments. When added to sand, it forms grind-stones; mixed with lamp or ivory black, being first dissolved in water, and with a little borax, it makes admirable ink. A new preparation of lac-dye is now used, and which, when

mixed with cochineal, makes so fine a scarlet that it is said to have saved the East India Company 14,000*l.* a-year in the purchase of scarlet cloth for the army.

The quantity of wax made by bees is enormous. In Spain alone, one single parish priest is said to have had five thousand hives. In Russia many peasants have four or five hundred bee-hives, and make more profit of their bees than of their corn. Since the introduction of sugar, honey has lost much of its importance, but still it is of great value in this country.

I have now endeavoured to point out to you some of the benefits which are derived from insects, and the knowledge of this cannot, I hope, have failed to impress on your minds the wonderful love of the Great Creator, who has formed everything for some good and wise purpose, and has been alike attentive to the comfort and well-being of the meanest insect, as well as to that of the highest of His creatures. In fact, if we examine through a microscope the smallest insect, we shall find them possessed of the power of seeing, smelling, tasting (for they have a tongue), and hearing. This last faculty is



easily ascertained by tapping on the outside of a hive of bees.

After what has been said, I think you will be disposed to own that in no part of His works has the All-wise Creator more vividly displayed His goodness as well as His power than in these atoms, if I may call them so, of creation. They are equally worthy of the study of the Christian and the naturalist, as well as affording instruction and entertainment to those I see around me.

I will now give you an instance in proof of this. You must all of you know the common egg-urchin, or sea-egg, or, as I believe it is sometimes called, the "Sca'ad man's head." Its structure is most wonderful. It is provided with tubercles,—one large and three or four small ones. One small tubercle will separate in rows of pairs—three pairs in each row. Small ridges and furrows also separate the pairs of rows from each other. From the pores protrude suckers, which are very long. The number of these suckers is very great. In a moderate-sized urchin you may count sixty-two rows of pores in each furrow or avenue. Now, as there are

three pairs of pores in each row, their number, multiplied by six, and again by ten, would give the great number of 3720 pores. The structure of the sea-urchin is not less complicated in other parts. There are above three hundred of what may be called plates of one kind, and nearly as many of another, all dove-tailing together with the greatest nicety and regularity, having on their surfaces above 4000 spines, each spine being perfect in itself, and each having a free movement in its socket. Its shell is composed of 10,000 distinct pieces, so accurately joined that the whole seems a single shell. Surely we may exclaim that the skill of the Great Architect of Nature is not less displayed in the construction of the sea-urchin than in the building up of a world!

Let me now talk to you a little of the star-fishes, or, as they are called in Ireland, "devil's fingers and devil's hands," where they are sometimes collected in great numbers and used as manure in gardens,—and an excellent manure they make. Now, I am aware that they are no favourites with you fishermen. In my younger days I used to like to go out early and catch a whiting or two for my breakfast. Suppose me

seated in a boat, and, after a pleasant pull of half-a-mile out to sea by a good honest fisherman, then preparing for sport. The water seems to laugh and sing, as the Psalmist described the waving corn, and sparkles in the morning sun, and dances around as the anchor—a heavy stone—is cast amidst the gently-swelling waves. Eager for the sport, the lines are prepared; there is a tug at the hook, and, hauling up the lengthened string, expect a prize; when lo! 'tis but a villainous star-fish that has seized the bait, gorging it deep and fast. Again we try, and with the same result. Bait after bait is thus devoured, till I begin to think that shoals of star-fishes are waiting there on purpose to annoy me. No whiting for breakfast! Who would keep his temper under such a trial?

But still they are some of God's useful creatures, and that to a great extent. The appetite of the star-fish is for carrion. Their restless industry is constantly employed in hunting out and swallowing all dead and tainted matters that approach the shore, and which, if permitted to accumulate, would soon pollute the very ocean, defile the air, and thus render the earth almost uninhabitable. Silently and quietly the work is

done by these unwearying agents. Cleanliness and health attend their operations, while each, like a living granary, pours forth innumerable eggs, and thus supplies abundant food for countless hungry mouths, peopling the sea with life, and thus adding to the boundless store of nature's provisions.

I have said that fishermen have a great aversion to all sorts of star-fish, or at least it was so formerly, and perhaps is so at the present time. Now these creatures have a wonderful power of reproduction. If one of its arms, or, as they are called, rays, and sometimes fingers, should be taken off, another would come in its place; and in this way, if it is pulled in several pieces, each piece will in time become a perfect star-fish. This may surprise you, but it is a fact well known to naturalists. Thus fishermen were formerly in the habit of tearing them asunder and committing their lacerated bodies to the waves. This plan was anything but the way of diminishing their numbers. You have probably now become wiser, and are content with throwing them on the beach and suffering them to die there.

Another interesting marine animal is the her-



mit crab, with which you are all well acquainted. In order to comprehend the shape of this creature it is necessary to deprive it of its habitation. It will then be seen to be formed of two distinct portions, the head and a good part of the body being covered with shell, like the fore part of a lobster, whilst the hinder or tail portion is bare, soft, and without any solid protection; so that, in order to defend its hinder regions, the creature is obliged to have recourse to the strange expedient of procuring a retreat in any shells that from their size and shape may be adapted to such a purpose, and which the occupants drag about with them on all occasions. I know that it is a question amongst you fishermen whether the crab selects an empty shell for his purpose, or ejects the lawful tenant of one which he takes a fancy to, by seizing his victim—the whelk, for instance—behind the head, and after killing it proceeding to eat it out of house and home, and then taking possession of the vacant residence.

The form of this crab is wonderfully adapted to its mode of life in a shell. It will be observed, that of the two claws with which it is furnished, one is exceedingly small when compared with



the other, and this is a wise arrangement of the Great Creator. Had the two claws been of equal size, both of them as large as the biggest of them, it is evident that they could never have been drawn into the shell. When alarmed, they draw in the smaller claw and close the opening with the larger one, which is thus protected. When the hermit crab grows too large for its shell, it may be observed crawling along a line of empty shells left by the last wave. They then slip their tails out of the old house into a new one, and in this way they will try a number of shells till they find one to their liking. They feed on any kind of putrid offal and garbage, and thus become nature's scavengers in cleansing our coasts.

And now let me say a few words to you respecting the prawn, perhaps one of the most exquisitely constructed of all marine creatures. They are, however, not to be judged of as you may see them boiled and dead in Mr. Hayllar's well-frequented shop; but in a glass-case called an aquarium, if they are well supplied with proper food and fresh sea-water, they will appear the merriest and happiest creatures possible. But it is to the way in which they get rid, once

a-year, of their old external covering, that I wish to call your attention. When this period arrives, the prawn ceases to feed, and goes about from place to place until it has fixed on one adapted for its purpose. It then stretches out wide apart its third, fourth, and fifth pairs of legs, and the feet are then hooked on so firmly upon a substance near, and in such a way that the body may be poised, and capable of moving freely in all directions. The prawn then slowly sways itself to and fro, and from side to side, apparently for the purpose of loosening the whole surface of the body from the skin or covering; the two pairs of legs are at the same time kept raised from the ground, stretched forwards, and frequently passed over each other with a rubbing motion. The eyes also may be observed to be moved within their covering, from side to side, by muscular contraction; and when every precaution appears to have been taken for the withdrawal of its body from the old skin, a crack is observed to take place between it and the abdomen, at the upper and back part, and then the head, antennæ, or, as they may be called, feelers, legs, feet, and all their appendages, are slowly and carefully drawn backwards, and out from the

dorsal or back covering, until the eyes are quite clear of the body shell, and appear above its margin. The prawn, thus half released, then makes a sudden backward spring or jerk, and the whole of the skin is left behind, generally adhering by the shell of its six feet to the substance it had selected for its purpose.

Now, one moment's thought will show you what a truly wonderful process this act of getting rid of its old covering really is. When we reflect on the small size of this creature, and the extreme delicacy of its various organs, and then find that this moulting of the shell, with its minute spines and microscopic hairs, is performed in the manner you have heard, it is impossible not to admire the wonderful power of an Almighty Creator who has called into existence so marvellous a creature.

When the prawn has been thus liberated from its old covering, it is at first perfectly helpless, and so soft that it has not the power of supporting its own weight. By degrees it gains strength, and then retires to some secure place till its different membranes have become sufficiently hardened to allow of its venturing forth among its companions without danger.

But it is time to conclude. You will observe, that one of the objects in my lectures is to draw your attention to the goodness and wisdom of Almighty God, as they may be seen in His works. These are so various, so beautiful—so perfectly adapted to the purposes for which they were created, that the very knowlege of them should make you better men and better Christians. Be quite sure, then, that there is a God Almighty, all wise and all good, and if we do not shut our eyes we may see Him in all His works, and learn not only to fear Him for His power, but to love Him for the care which He takes of us and of all His created beings.

## IX.

## ON REPTILES.

MY DEAR FRIENDS,—

I have not, in any of my lectures, said anything on the subject of reptiles, such as turtle, alligators, vipers, snakes, frogs, &c.; and yet I may, perhaps, amuse you by entering a little into some of their history, for many interesting facts may be related of them. These reptiles have their use in the arrangements of Providence, and you should never lose sight of the fact, that nothing has been created but what is for the general good.

Amongst the larger of what may be called reptiles, and which are occasionally found on our coasts, may be mentioned the turtle. The habits of this creature are interesting. At the Isle of



Ascension, and in many other places, innumerable multitudes of turtles arrive in the early part of summer, resorting to their favourite breeding-places. Some come from a great distance. On first nearing the shore, and generally on fine, calm, moonlight nights, the turtle raises her head above the water, when about forty yards from the beach, looks around her, and should she see nothing likely to disturb her, she sends forth a loud hissing sound, and then advances slowly towards the beach, crawls over it, and, when she has reached a place fitted for her purpose, looks all around her in silence. She then proceeds to form a hole in the sand, which she does by removing it from under her body with her hind flappers. The sand is thus raised alternately by each flapper until it is heaped up behind her. In this way a hole is dug to the depth of from a foot and a half to two feet, and which is done in about nine minutes. The eggs are then dropped into it, one by one, in regular layers, to the number of a hundred and fifty to two hundred. This is done in about twenty minutes. She then scrapes the loose sand back over the eggs, and so levels and smooths the

surface that few persons on seeing the spot could suppose that anything had been done to it. After this operation she quickly returns to the sea, the eggs being hatched by the heat of the sand. Each turtle has generally three layings of eggs in the season. When the young ones are hatched, which takes place from a fortnight to three weeks after the eggs have been deposited, they make their way to the water, when numbers of them fall a prey to birds, or are seized in the sea and devoured by shoals of fish and crocodiles. However, as we have seen that the female turtle deposits her eggs—probably altogether to the number of five hundred—three times a-year, we may suppose that many escape from their enemies, and thus a provision is made for keeping up a due supply of these useful creatures. This is very much the case with respect to the guinea-fowl. In the extensive woods of Africa these birds are found in great numbers. They lay their eggs on the ground to the amount of twenty or thirty, and the shells of these eggs are so hard that it is not easy to break them. Now, as snakes, which will feed on eggs, are very numerous in these

woods, it is evident that, except for the number of eggs laid and their hardness, they would be devoured by the snakes, who occasionally remove some from the nest in trying to break them. I have always looked upon this fact as a beautiful arrangement of Providence for the preservation of His creatures.

I will conclude my notice of the turtle with the following anecdote, which was told me by the late Lord Adolphus Fitzclarence:—In the Island of Ascension turtles are kept in considerable numbers in tanks, to supply the ships which call there. Lord Adolphus commanded a frigate which, on its way to England, touched at Ascension and shipped a number of turtles; but as the voyage home was protracted, many of them died, and were heaved overboard. One large one, called Lord Nelson from its having lost a flapper, survived till the ship was in the Channel, when it appeared so nearly dead that it was thrown into the sea. All these turtles were marked on the shell, as usual, with a hot iron. In the course of a year this turtle was again taken in the Island of Ascension, and was immediately known by the marks as one of those

sold to Lord Adolphus Fitzclarence. It is a curious fact, for the animal must have made its way through some hundred miles of sea.

The largest reptiles are the crocodile and the alligator; and, luckily for sea-bathers, not known in this country. Their history is, however, curious, and their habits worth noticing. I will begin with the crocodile. This reptile sometimes attains the length of twenty-five feet, and is by many supposed to be the leviathan of Job, as mentioned in the 41st chapter, and also in the Psalms. It swims rapidly, is very dangerous, and constantly seizes and feeds on human beings. When the British had a detachment of soldiers and some artillery on the banks of the mouth of the river Indus, in the East Indies, a large old crocodile carried off two or three natives, one of them being a woman. Its skin was so thick that no ball penetrated it, so some young artillery officers formed the following plan for destroying it:—They killed a sheep, and in its body placed a bag filled with gunpowder and some other combustible matter, to which a long wire was attached, with detonating powder at the end. Presently the crocodile saw the prey and seized it, and carried it to a hole which he



was known to frequent. Time was allowed him to swallow the sheep, when the wire was pulled—the water then became violently agitated—a loud report was heard, and up came the crocodile dead, and his stomach blown open. It is a curious fact, that in the Nile no crocodiles are found in certain degrees of latitude, but they are between  $26^{\circ}$  and  $28^{\circ}$ . Cairo is  $30^{\circ}$ , where they are never seen.

The female deposits her eggs in the sand, about a hundred in number, and nearly the size of those of a goose. An animal called the ichneumon has long been famous in Egypt, where it goes by the name of Pharaoh's rat. It hunts for, digs up, and devours the eggs of the crocodile, thus preventing too great an increase of these dangerous reptiles.

Mr. Curzon, in his travels to visit the monasteries of Egypt, gives the following pleasing and interesting account of his adventure with a crocodile. He says:—

“ I had always a strong liking for crocodile shooting, and had killed several of them. On one occasion I saw, a long way off, a large one, twelve or fifteen feet long, lying asleep under a perpendicular bank, about ten feet high, on



the margin of the river. I stopped the boat at some distance, and noting the place as well as I could, I took a circuit inland, and came down cautiously to the top of the bank, whence with a heavy rifle I made sure of my ugly game. I then peeped over the bank, and there he was, within ten feet of the sight of the rifle. I was on the point of firing at his eye, when I observed he was attended by a bird called a ziczac. It is a species of plover, and as large as a small pigeon. The bird was walking up and down close to the crocodile's nose. I suppose I moved, for suddenly it saw me, and instead of flying away, jumped up about a foot from the ground, screamed "Ziczac! Ziczac!" with all the powers of his voice, and dashed himself against the crocodile's face two or three times. The great beast started up, and immediately spying his danger, made a jump up, and dashing into the water with a splash which covered me with mud, he dived into the river and disappeared. The bird, proud apparently of having saved his friend, remained walking up and down uttering his cry with an exulting voice, and standing every now and then on the tips of his toes in a conceited manner." The circumstance of the crocodile

being often attended by the ziczac has been doubted by some naturalists, but the above anecdote would serve to prove the truth of it. Indeed, Herodotus, an ancient historian, who is generally to be depended on, states that all beasts and birds avoid the crocodile except a small bird which he calls the trochilus, with which the crocodile is always at peace, for he receives benefit from it. When the reptile gets out of the water on land he opens his jaws, when the trochilus enters his mouth and swallows the leeches which infest it. The crocodile is so well pleased with this service that it never hurts the bird. A celebrated French naturalist, after investigating the subject, thought that there was good foundation for the story of this ancient writer.

You may ask, Of what use are crocodiles? They play their part, and that an important one, in the economy of nature. They are to the great rivers of the tropics what wolves and hyenas are to the land and the sharks to the sea. In fact, scavengers clearing away offal and carrion, which would poison the waters and taint the air.

But it is time to turn to the alligator, a va-

riety of the crocodile, although differing from it in many respects. In the first place they make an incredibly loud and terrifying roar, especially in the spring, their breeding season. In the great river Amazon, where these creatures abound, when hundreds are roaring at the same time, it resembles thunder. Unlike the crocodile also, the female makes a nest in the shape of a cone, four feet high, and four or five feet in diameter, constructed of alternate layers of eggs, and of mud, grass, and herbage. When the young are hatched the female tends them as a hen does her chickens. Their cry is like the whining and barking of young puppies.

It would appear, from various accounts, that alligators are much more ferocious than crocodiles; in fact, a much more dangerous reptile. For instance, in one of the Manilla Islands a man rode his horse across a river in a place known to be frequented by an enormous alligator. He got half way over the stream when the alligator came upon him. His teeth went into the saddle, which he tore from the horse, while the rider tumbled over the other side into the water and made for the shore. The alligator, disregarding the horse, pursued the man,

who safely reached the bank, which he could easily have ascended; but, rendered foolhardy by his escape, he placed himself behind a tree which had fallen partly into the water, and, drawing a heavy knife, leaned over the tree, and, as the alligator approached, struck him on the nose, and kept on repeating the blows until the animal, exasperated at the resistance, rushed on the man, and seizing him by the middle of the body, which he crushed, swam into the river, where the poor man's sufferings could not have been very long. This alligator was soon afterwards killed by means of being drawn into three very strong nets placed in the river: he broke through two of them, but got entangled in the third, and was speared to death after a long resistance. This tremendous brute was nearly thirty feet in length and sixteen feet in circumference, and his head alone weighed three hundred pounds.

A young girl, about thirteen years of age, was washing a towel in a river frequented by alligators. She did not attend to a warning to beware of them, and just as she was boasting that she did not care for them, a scream for help was heard, and a cry, "Lord, have mercy on me!



—alligator has caught me!” The body was found, some days afterwards, half devoured.

An English naturalist, who was in search of plants in South America, says, “I was disappointed not to observe a single plant, except the rank grasses, round the margin of the river; but alligators were laid in the water in almost countless numbers, resembling so many black stones or logs. What we had seen in the river Amazon of these reptiles was nothing compared to their abundance in the Ramos river and its adjoining lakes. I can safely say that at no one instant, during the whole thirty days, when there was light enough to distinguish them, were we without one or more alligators in sight.” In the lakes, towards the close of the rainy season, myriads of ducks breed in the rushes, and here the alligators swarm to feed on the young birds. If a sportsman fire at the ducks in these places, he has but a poor chance of bagging many; for the instant a bird falls on the water the alligators rush towards it and crash their huge jaws upon each other’s heads in their hasty attempts to seize it. When alligators have been hungry, they have been known to upset a small boat in order to feed on the rowers. Many instances



have been recorded of persons having lost an arm or a leg, which has been taken off by these monsters.

The alligator of North America buries itself at the bottom of marshes till the spring sets in, and it is then in such a state of torpor that slices may be cut from the animal without arousing it. On the other hand, the alligator revels in the moist heat of Florida, and is formidable, both in numbers and size, at a mineral spring near the Musquito River, where the water, on issuing from the earth, is not only nearly boiling, but is strongly impregnated with copper and vitriol.

I will now talk to you about that poor, persecuted, but harmless and useful reptile, the toad, and I hope to rescue it from some part of that ill-treatment it so constantly meets with. It is a timid creature, perfectly inoffensive, and, as I know, will attach itself to those who show it kindness. Mr. Bell tells us that he had a large one that would sit on one of his hands and eat from the other. A true lover of Nature, in that simplicity and singleness of heart which always belong to that character, will find in the toad much to admire, although it must be confessed it has an ugly appearance. It is of

great use in a garden, devouring great numbers of slugs, worms, and destructive insects. It is kept in cucumber and melon frames for that purpose. I got a friend to send me twelve toads in a box from Jersey for the late Mr. Knight, of the Exotic Nursery, Chelsea, for one of his stove-houses, which was much infested with insects, and they cleared it of them very quickly. It darts its long tongue out when two inches from its prey, and seizes it so rapidly that it is difficult to perceive its motion. Three gentlemen, while walking on the Fairlight Downs, near Hastings, saw a toad squatted on the ground, holding the head of a viper in his mouth. The viper writhed its body as if trying to escape, but to no purpose. The eyes of the toad glared, and it showed much ferocity. The entire head of the viper was in the toad's mouth, which seemed completely filled in consequence, and its jaws were closed, and yet it appeared to breathe freely. This is the only instance I have ever heard of a toad attacking a viper.

The toad, like the snake and other reptiles, sheds its skin at certain periods; but not until a new one has been formed underneath. The old skin then cracks along the back and belly, and

after a few struggles and shakes the toad is free.

It is a curious fact that, although toads abound in the Island of Jersey, they are never found in the neighbouring island of Guernsey, and, if imported into it, always die.

Much has been said and written of live toads being found in blocks of stone and in trees; but I have not been able to procure an authenticated fact of this circumstance: nor is it likely that they would live for hundreds of years in such situations as has been confidently stated. I once put a toad in a flower-pot, which I placed on a flat tile, stopping up the hole at the bottom of the pot, and buried them about a foot deep in the earth. At the end of the year I released the toad, and found him as well and as lively as before his imprisonment; but this is no argument of their living many years in a block of stone. It is torpid in winter, and then retreats into some sheltered spot, and there remains till the return of spring.

The frog is, perhaps, a more interesting reptile than the toad. It is as harmless as well as a very useful creature, serving Frenchmen for food, but living itself on various insects and slugs,

which it devours in large quantities, so that it should always be encouraged in gardens. In winter, they congregate in multitudes, generally in the mud at the bottom of the water, adhering together so closely that they appear like one mass. They separate on the return of spring; then their cheerful croak is again heard, and they recommence their active life.

Frogs have been supposed, as far back as the times of good old Izaak Walton, to have a great antipathy to pikes, killing that fish whenever it can. There is some truth in this. A gentleman, walking in the spring on the banks of a piece of water at Wimpole, the seat of Lord Hardwicke, observed a large pike swimming in a very sluggish manner, near the surface of the water, having two dark-coloured patches on the side. A few days afterwards he saw the same pike floating dead upon the surface of the water, and, having drawn it to land by means of a stick, he found that the two dark-coloured spots were two living frogs, still attached to the fish, and that so firmly that it required some force to push them off with a stick. These reptiles are so well known that little more need be said of them. They are a

favourite food of the common snake; and while the snake is endeavouring to swallow a frog, the cry of the latter is very loud and distressing.

But I must conclude. I have done my best to amuse you, by setting before you some of the Great Creator's works, all of which have their peculiar uses assigned to them. Let us also be thankful that this happy country is not infested with those reptiles which you have heard abound so much in hotter countries. This is one, among many blessings, bestowed on this land.



## X.

## ON THE HABITS OF ANIMALS.

MY DEAR FRIENDS,—

I am going to read you a lecture on the habits of animals generally, and hope it will amuse you. One of my objects is to do so, and another to instruct you. In fact, the instincts of animals, their contrivances, their architecture, their forethought, their affections, and various other circumstances connected with their several modes of life, are, indeed, lessons of instruction to every one. They show the goodness of the Great Creator. They serve to prove the truth of what the Psalmist said, "The eyes of all wait on Thee, and Thou givest them their meat in due season." If the most insignificant little living creature is viewed through a microscope, it will be found to be

most exquisitely formed, and to possess all those functions which are necessary to its well-being. I wish to impress this strongly on your minds, that you may be able to view Almighty God in His works, and thus learn to love and admire Him as the Author of all good. Having stated this, I will now proceed to give you some curious instances of instinct amongst what are called the inferior animals, that is, of animals which are supposed to be almost without sense or power of motion.

You are all of you acquainted with the common sea-hog, or sea-egg. To look at it you would suppose it to be without sense, or the possibility of regarding external objects by sight or hearing; yet it will travel up the rods of a crab-pot, enter the opening, descend within, mount again to the situation of the bait, and choose the one which pleases it best.

Again, the star-fishes seem very inactive, and without intelligence; yet they display sagacity in the discovery and choice of food, as well as in the manner of seeking it, and also alter their habits in different seasons.

You might suppose that cuttle-fishes were

without any sense, and yet they show some degree of curiosity by their moving up to a shining object to examine it; and when in danger, they become suddenly suffused with a decided blush of red, and then eject the contents of their ink-bag, by which they become concealed from observation.

The oyster closes its shell when it comes in contact with some objects, and opens it on the flowing of the tide, so that its structure is wonderfully adapted to the wants and circumstances of a creature so apparently unconscious of a want, or, if it had one, so incapable of supplying it.

But let me turn to a higher order of animals; and I will begin with birds, and their instinct of migration. You are aware that numbers of birds arrive in this country in the spring from far-distant regions, flying over immense tracts of land and sea in one unerring line, and generally doing this in the night. This instinct induces them to seek a warmer climate at one season of the year, and a colder at another. It cannot be supposed that the old birds lead the young ones in these migrations, for it has been ascertained that late broods have taken

their flight long after their parents have departed. Indeed, the young cuckoo has never known a parent's care, since it is brought up in the nest of some other bird; yet it leaves this country long after others of the same species, being then a solitary individual, and finds its way to the groves of Greece and the sunny regions of Italy. Now, it is quite clear that this extraordinary migratory instinct must have been implanted in this and various other birds by a merciful Creator, for purposes intended for their well-being in climates congenial to their respective wants. And then, with what pleasure may we listen to the songs of numerous warblers which arrive amongst us in this blessed country, the nightingale being amongst them, cheering us with their music, and proclaiming the loving-kindness of our Heavenly Father!

But this migratory instinct is not confined to birds. The extensive plains of North America were formerly more frequented by vast herds of buffaloes than they are at present, in consequence of the destructive attacks made upon them, not only by the Red Indians but by the American settlers. At certain periods a strong

migratory impulse seizes upon those great herds, and they rush along the plains, cross rivers, ascend hills, and go in one undeviating line to some far-distant locality, overturning tents and other obstructions in their way. So it is, also, with the land-crabs of Jamaica. When the season arrives they quit the upper country and make a rush towards the sea-shore in a direct line, and nothing stops their progress, so strong is the migratory instinct.

This extraordinary impulse is also possessed by some insects. In Australia a migratory procession of caterpillars may frequently be observed. They travel in single file, having a leader; and each is so close to its predecessor as to convey the idea that they were united together, moving, like a living cord, in a continuous line. If one caterpillar should be taken from the middle of the line, the one immediately before him suddenly stands still, then the next, and then the next, and so on to the leader. The same takes place at the other end of the line. When the caterpillar which is removed gets into the line again, the whole move forward as at first, thus apparently having some means of communication with the leader.



This was not a solitary experiment, but has been repeatedly tried during the progress of these insects, and proves the extraordinary fact of the power of communication existing amongst them.

Quails have a strong migratory instinct, and so regular is their arrival in the island of Malta, that the day of their coming is noticed in the published calendar of the island, as the change of the moon is in ours. A great flight of storks also takes place annually in the Mediterranean, about the same period of the year; and I was assured by the captain of a ship, who was engaged in making surveys on the coast, that those young birds which were incapable of performing so long a flight during the migratory impulse, were conveyed on the backs of their parents to far-distant places, some of them making their way into Persia.

One of the most curious instances of migration is in the case of the heron. Heronries are not very common in England, and certainly there are not any within some miles of Richmond Park, in Surrey. Yet year after year (for I reside in the neighbourhood) I have seen from fifty to sixty herons assembled on a large open

space in that park, not moving about or seeking for food, but appearing as if they had met together to consult on some important subject. What their object was I never could even guess at; and it must be some extraordinary instinct which brings them thus together, especially as no heronry has so many of these birds belonging to it, so that the assembly must consist of several heronries.

It is an interesting fact, that instinct leads migratory animals in general to pursue one invariable direction in their passage from one distant country to another. They have neither compass nor guide, and yet they rarely deviate to any great extent in their journey. Mountains and wide seas intervene, and yet young and old find their way. Inscrutable as this instinct may appear to our dull perceptions, it is implanted in His creatures by a wise and good God, who leads even the little, feeble insect-hunting birds to go remote distances from their homes to seek for that food which they require. Indeed, their rapid flight proves that they have a conscious security of finding it. A lady told me, that while cruising in her husband's yacht in the wide seas of South America, she

witnessed a migration of butterflies, which were far distant from any land, and on a subsequent occasion a migration of humming-birds. Change of weather, no doubt, produces migratory impulses—a fact which some of you fishermen are acquainted with.

Some few years ago immense cloud-like swarms of dragon-flies passed in rapid succession over a town in Germany. Their progress was from south-by-west to north-by-east, some flying high and others low, and they struck against the windows of houses situated on eminences. We are not visited in this country by locusts, which commit such vast injuries on crops in the East. When the migratory impulse is on them they swarm in vast numbers, taking long flights, and sometimes alighting in the sea and perish.

Some animals change their quarters (it may be called migration) for unaccountable reasons. For instance, the badger, which is a solitary animal, and once very numerous in this country, would assemble to the number of nine or ten, and travel by night to some other locality. If any one happened to disturb them in their progress, he was attacked with the greatest

ferocity, although when single they are perfectly harmless. Rats and mice are also known to migrate; but always by night. Speaking of rats, I may tell you that a gentleman in Herefordshire laid up about two bushels of walnuts, and on the following morning he found that they had all been carried away by rats.

But I should tire you if I were to continue longer the subject of instinct in animals, although I might pursue it to a great extent. In many cases it amounts so nearly to reason, which latter faculty is supposed to be possessed only by the human race, that it is difficult to define where instinct begins and reason ends. You may judge for yourselves when I give you the following anecdotes:—

A fox, partly tamed, was kept fastened by a chain to a post in a court-yard, and was chiefly fed on boiled potatoes. Many fowls also were kept in the same yard, but had sense enough not to come within reach of the fox. He was, however, too cunning for them, as you will find. Having bruised and scattered the boiled potatoes which he had received for his dinner at the extremity of the space the chain would reach, he retired to an opposite direction, and put on the



appearance of being asleep. His cunning succeeded, for some of the fowls were thrown off their guard, and came within the circle of danger to eat the potatoes. The fox then sprang upon them and seized his prey. Was there not some degree of reason in this?

Again : an old man was walking one day upon the banks of a river, when he observed a badger moving leisurely along the ledge of a rock on the opposite bank. In a little time a fox came up, and after walking some distance close in the rear of the poor badger, he leaped into the water. Immediately afterwards came a pack of hounds in pursuit of the fox, who by this time was far enough off floating down the stream, but the unfortunate badger was instantly torn to pieces by the dogs. Here was cunning combined with reason. A fox has been seen to drop the end of his tail among rocks on the seashore in order to catch the crabs below, hauling up and devouring such as laid hold of it.

I will now give you an instance of what might be called reason in a dog, and which occurred in this town. A lady, proceeding to the house of one of her pupils, near Brunswick Place, had her cloak seized by a dog, that pulled her the



contrary way to which she was going. As she could not disengage herself, she permitted herself to be led till she was brought to the open space at Wick, when she became alarmed, and asked some men to drive the dog away. They persuaded her to see where the animal would lead her, promising to protect her if necessary. He brought her to a house which was then in the course of erection, and began to scratch at the end of a plank, which was laid across the open unfinished area of the house for the workmen to get into it. The plank was lifted up, and a beef bone found under it, which the dog seized and ran away with. This dog belonged to an excellent, charitable clergyman at Wick, who told me the anecdote after he had taken some pains to ascertain its accuracy, so that it need not be doubted. It is a curious instance of a reasoning faculty in an animal. But I must now conclude.

You will recollect that I have given you several lectures on Natural History, and I wish you to consider them, not as a mere gratification of curiosity, or as vehicles for amusing anecdote, but as affording proofs of a Superintending Providence, and of the care bestowed

on all the works of creation by a Being, infinite in power, wisdom, and goodness! Indeed, he must be wilfully blind who does not observe Divine interposition, not only in human affairs, but in everything connected with the animal and vegetable creation. With respect to the vegetable creation I may tell you, that if potatoes are put in a cellar and the least ray of light admitted, the shoots of that vegetable will move in a direct line to that light. Again: if the root of a plant be uncovered, without exposing it to too much heat, and a wet sponge is placed near it, but in the opposite direction from that in which the root is proceeding, you will see the root turn towards the sponge as if wanting to imbibe its moisture.

Lastly, place an upright pole near an unsupported vine which is growing in an opposite direction to the pole, it will quickly alter its course, and stop not until it has fixed itself to the pole. These facts may excite our astonishment, but they should, at the same time, produce in us feelings of gratitude, and, I may add, of confidence towards that benign Being who supports us as well as the humble vine, and showers down His blessings upon us.

## XI.

## THE GOODNESS OF GOD.

MY DEAR FRIENDS,—

I am glad to meet you again, and to see those faces around me which I have so frequently looked upon with pleasure. That pleasure is increased by the feeling that I may not only have amused you, but possibly have done you some little good, inducing you to feel that, although your occupation leads you on the great waters, you have an immortal soul to attend to. You fishermen ought, indeed, to be more conscious than landsmen that you are in the Divine Presence, and have been constantly indebted to Divine protection. When at sea, you have little to look upon but the heavens above or the boundless ocean around you. Both

may seem to be created on purpose for you—the sun to guide you by day, and the stars by night; the sea to bear your boats on its bosom, and the breeze to waft you on your course. You probably feel how powerless you are of yourselves—how frail your vessels—how dependent you are on the goodness and mercy of your Creator, and that it is He alone who can rule the tempest and control the stormy deep. The ocean for awhile separates you from the vices and temptations of the world, and enables you to reflect that God is the author of all you see around you.

I have entered into these remarks, because I wish in this lecture to give you some proofs of the goodness of the great Creator in furnishing every animal with those habits and that clothing proper for the country in which they live, and also how admirably the structure of their bodies is adapted to their peculiar way of life. Thus, for instance, elephants, rhinoceroses, and monkeys feed upon vegetables and fruits that grow in hot countries; and such places are, therefore, allotted to them. No sun is too powerful to hurt them, and they do not need hair or wool to keep them warm. On the contrary, the reindeer

are found in the coldest part of Lapland, and they are covered with the thickest hair, and thus can defy the severity of the winter. In like manner, the rough-legged partridge passes its life in the Lapland Alps, feeding upon the dwarf birch; and that they may be able to run about safely amidst the snow, their feet are feathered.

The camel frequents the sandy and burning deserts, nor could they be passed without him; but how wisely has the Creator contrived for him! In traversing the deserts, where no water is to be found for many miles, and where every other animal would die of thirst in such a journey, the camel can undergo it without suffering, for his stomach is full of cells, in which he reserves water for many days.

The pelican also lives in deserts and dry places, and frequently builds her nest far from any water, in order that her eggs may be hatched by the heat. She is, therefore, obliged to bring water from afar for herself and her young, for which reason Providence has furnished her with a very large bag under her throat, which she fills with a quantity of water sufficient for many days.

The feet of goats are admirably adapted to



enable them to climb over rocks and the precipices of mountains.

Swine, especially in their wild state, have very strong powers of smelling. Thus they are able to find succulent roots in the ground, which they turn up and feed upon.

Squirrels are so formed that they can climb up trees with great rapidity, and so are woodpeckers.

Swallows are beautifully made for their peculiar mode of life. Thus the shape and lightness of their bodies, and the length of their wings, not only enable them to fly from morning to night, in search of flies and other insects, but also to take long flights across wide seas and distant lands to different climates; according to the seasons of the year.

Look, again, at the mole, how curiously it is made for its underground life! Its fur is close, thick, and soft; its feet are admirably made to enable it to form its runs in the earth; its eyes are so small that nothing can injure them; and its powers of smelling so acute, that it can detect worms and other insects under the soil on which it feeds. Its sense of hearing is so acute, that if a footstep approach the spot where it is at

work, it will immediately cease its operations. It is a most useful animal, although many farmers are so foolish as not to have found it out.

But it would be an endless employment if I were to enter fully into the various ways in which a benevolent Providence has provided for the wants of His creatures by their peculiar formation. I will now endeavour to give some instances of those peculiar instincts which some animals possess, and which tend to their self-preservation, or that of their young. For instance, when a female otter has been attacked in company with her young one, she will clasp it with her forefeet and plunge beneath the surface. Instinct tells her, that although she can remain for some time under water herself, her young one cannot, and, therefore, she is forced to rise again very soon. Her love for it is so strong, that if it is taken its cries bring her to the side of the boat, where she often shares the fate of her cub.

When rooks are feeding, they always place a sentinel on a tree to give an alarm in case of danger. Fieldfares, and other birds which collect together in large flocks, do the same. In-

instinct alone could have taught them the necessity of doing this.

You have probably heard of the monks of St. Bernard, whose monastery is situated amongst the snow and ice of the Alps. They have a fine, strong, and intelligent breed of dogs, which have been taught to wander over the snow, and seek for travellers who have been buried in it; and thus many lives have been preserved. A friend of mine procured a very young puppy of this breed from the good monks, and brought it to England in the winter. There was snow on the ground when it was turned loose, but, young as it was, it immediately began to scratch in the snow, as if seeking for some one, so strong was its instinct.

We have about forty little, tender, migratory birds, which arrive in the spring, and many of them cheer us with their songs. Now, these birds must fly over wide seas and lands before they can reach our shores; and this is generally done in the night. You may ask, What leads them to do this—to encounter so much danger and fatigue? It is an instinct which Almighty God has implanted in them; and so unerring, it is supposed, must be their flight, that they come

in one direct line to this country in the proper season.

When a salmon has been hooked or taken in a net, it immediately discharges the contents of the stomach, as instinct teaches it that it has a better chance of escape with an empty than a full one.

Some animals will put on the semblance of death when their lives are in danger. For instance, the opossum does it; and the common snake will do this, and also a bird called the landrail, and some beetles.

Instinct has taught the peacock, when danger threatens it, to expand its beautiful tail, to shake its quills, and to hiss like a serpent, the shape and colour of its head resembling that reptile; and it must be a bold animal which would attack it in this position.

When a cat gets into a wood, and tries to conceal herself, that she may find an opportunity of seizing her prey, you may hear the screams of blackbirds, and the alarmed cry of numerous other birds, all directing their attention to the spot where the cat is concealed, thus informing the whole neighbourhood of the pre-

sence of an enemy. This is the instinct of vigilance.

Instinct shows itself in a variety of ways. For instance, an otter produced a pair of young ones in the Zoological Gardens in London, and these young ones got into a pond when but half filled with water, and were unable to climb up its perpendicular sides. When they had remained in the water some minutes, the mother appeared anxious to get them out, and made several attempts to reach them from the side of the pond. She then plunged into the water, and, after playing with one of them for a short time she put her head close to its ear, as if to make it understand her intention, and then sprung out of the pond, while the young one clung tightly by its teeth to the fur at the root of her tail. Having landed it she rescued the other in the same manner. This offers a curious instance of a communication of ideas between a parent and its young, in consequence of some peculiar instinct; but it also shows the early age in which intelligence is possessed by offspring.

The love of life is possessed in common both by man and animal. In the latter, instinct



teaches it to avoid danger, and in man reason is brought into action for his self-defence. A moor-hen, whose nest among rushes had been frequently destroyed by a sudden rising of the water in a neighbouring pond, built a nest in a spruce-fir tree near it, at a height of twenty feet from the ground, instinct teaching her that there it would be safe. A similar instance occurred in my own neighbourhood in Richmond Park, where there were some Cape geese. These laid their eggs on an island in the middle of the pond, but they were constantly fed upon by water-rats. Finding this to be the case, the geese made their nests in some oak pollard trees near the water, where they laid their eggs and hatched their brood in safety. They then took their young, one by one, in their bills to the pond. I have known a swan, just previous to a sudden rise of a river, add a quantity of materials to her nest, assisted by her mate, so as to raise it above the flood-mark at least two feet, and thus prevented her eggs being chilled. Creative Wisdom could alone have endowed the swan with this extraordinary instinct of foreseeing a flood and guarding against its consequences.

Instinct has taught a curious little animal in Australia, something between a rabbit and a rat, to collect two or three cartloads of sticks, interwoven in such a way as to form one solid mass, and in this the young are brought forth and reared. The object in doing this is to protect the young from being destroyed by the wild dogs of the country. Instinct has also taught some birds, where monkeys and snakes abound, to build their nests at the extremity of slender branches of trees, in which they lay their eggs and rear their young in perfect security.

At Cape Comorin, the most southern part of Hindostan, there is a bird call the baya bird, which suspends a glow-worm to its nest. These birds are very numerous there, and they have hanging nests. At night each of their little habitations is lighted up by a firefly stuck on the top with a bit of clay. The nest consists of two rooms. Sometimes there are three or four flies on them, and their blaze in the little cell dazzles the eyes of the bats, which often kill and feed on the young of these birds. I have the authority of Dr. Buchanan for this interesting anecdote.

In relating these facts to you, I wish to im-

press on your minds that no creature, however weak and ignoble it may appear, is left unprovided and defenceless to take its chance in the struggle for existence. Each is endowed by its Creator with bodily and mental attributes, most perfectly adapted to its sphere of action. The humble worm is furnished with innumerable hooks to enable it to penetrate the soil, and to turn up those little hillocks or casts which you must have seen, and which enrich the earth. The spider spreads its beautiful network to catch its prey, showing an industry and perseverance equally extraordinary; while the little bee flits about from morning to night in search of honey, with which to store her hive, hastening from flower to flower: thus fertilising blossoms in her flight, and rendering the fields and gardens gay with flowers and productive of fruit. And here I cannot help quoting part of a speech made lately at Leeds by one of our Ministers, Lord Palmerston, on this interesting subject. He said:—"The contemplation of these organic beings must fill the mind with admiration at the amplitude of the creation, and of the care and skill and wisdom which have

directed the Great Creator to whom they owe their origin." It has been my endeavour to prove to you how beautifully and beneficially God's providence acts upon His creatures by endowing them with habits, formation, and instincts necessary for their self-preservation, and which, as you have heard, one of our most enlightened Ministers thought worthy of notice while addressing a large audience of people.

What I have been saying to you is not only for the purpose of proving to you the wisdom and goodness of the Great Creator in every thing we see around us, but to set before you how beautifully and beneficially His providence acts upon His creatures by endowing them with habits, formation, and instincts necessary for their self-preservation. This is a subject well worthy of your consideration; for if God feeds the raven and attends to the cry of her feeble young for food and supplies it, how much more readily will He hear your prayers, if they are poured forth with an earnest and humble desire of being benefited by them! I also wish to impress upon you that God's method of government is by rewards and punishments—that is,

that He will punish evil and wicked men for their conduct in this world, and reward those, both in this world and also in the next, who with humble and contrite hearts diligently seek Him.



## XII.

THE ARRANGEMENTS OF  
PROVIDENCE.

MY DEAR FRIENDS,

I am going to give you a lecture on some of the works and arrangements of the Great Creator of all things, and which may serve to prove to you His care and goodness in providing for the wants of His creatures. Some of the facts I am going to tell you may appear trifling; but nothing can be called trifling which shows beneficial contrivance proceeding from the hands of Almighty God.

Some of you, in the course of your lives, may have wandered over old pasture fields, which

have not been broken up by the plough. The grass may have been eaten short by sheep and other cattle; but you will perceive a quantity of what are called bents, which remain untouched by them. In fact, these bents, or stalks, are extremely bitter. Now, these bents contain the seed of grass, and, when ripe, they fall on the ground, and thus vegetate and renew the turf, and produce food for the cattle. But for this, pastures would not give us that abundance of milk and butter we now have, or would the cattle be fattened for food for man. We may see in this fact a remarkable instance, as it has always appeared to me, of a beautiful arrangement in the design of Providence for refreshing the different pastures on which so many cattle find their sustenance. Indeed, the extreme bitterness of these stalks of the grass is so great that neither hares nor rabbits will touch them.

Amongst other beautiful arrangements of Providence for the welfare of His creatures may be mentioned the mistletoe. This parasitic plant ripens its seeds late in the spring. Now, we know that, in a severe winter, numerous birds feed on hips, haws, and other berries; but, if a

late frost and snow should come after these are consumed, the poor birds would probably be starved, but for the seeds of the mistletoe, which are then ripe, and afford a nourishing supply of food: so tender are the mercies of God over all His creatures. Not only are birds thus cared for by a superintending Providence, but, when food begins to fail them in one country, a strong migratory instinct is implanted in them, and which induces them to fly to some other, and this over vast seas or extensive tracts of land, till, like the swallows, they arrive in regions adapted to their wants, and where they sing their songs of joy and love, till the same migratory instinct returns, and they fly back to their former abodes: thus enjoying perpetual seasons of sunshine and happiness.

It has always struck me as a beautiful arrangement of Providence that the female of birds should generally have less gorgeous colours than the males. Take, for instance, the hen-pheasant. Had she the beautiful plumage of the male, she would be a conspicuous object for birds of prey while she sat on her nest. Her very humility saves her life. The female eagle, on the contrary, is larger, stronger, and more

beautiful than the male bird, enabling her to convey to her young, lambs, fawns, and hares: as the providing food for them chiefly devolves on the hen bird. For this purpose she is furnished with nails, strong claws, and a sharp and hooked bill, that she may the more easily catch her prey.

I will now mention a fact which I consider an interesting one. You are aware that salmon form a very important article of food, and a very excellent one also. The fish may almost be considered as belonging to the sea, although it is very seldom that one is taken in it. Now, in order to become beneficial to man, it is infested with what are called sea-lice, and these insects annoy it so much, that salmon ascend rivers as if they were aware that their tormentors would then drop off, which is always immediately the case. The fish are now in their best season, and vast numbers are taken in nets; and there would be many more if strict regulations were enforced to allow them a freer passage, which, it is to be hoped, will now be done. Those which escape the nets ascend to the spawning grounds, and afterwards remain in the river. Here they are again attacked by

what is called the river-louse, or rather leech, which fixes itself on the inside of the gills, and drives the salmon back to the sea. On arriving there, it has been ascertained that these leeches do not live an hour, and the growth of the fish is then wonderfully rapid, increasing in weight, as has been found by marking fish on their way to the sea, to five or six pounds before the next ascent of them in the rivers, the following year. It is evident, then, that the creatures I have mentioned serve to propel the salmon to and from rivers: thus fulfilling those instincts which Almighty God has implanted in them.

I do not suppose that many of you have seen the kingfisher in its wild state, as they are almost exclusively river birds, although, during hard frosts, they may possibly frequent the sea-shore in search of food. Their nests are made very often in old rat-holes in the banks of rivers, and generally to a depth of three or four feet. Now, as the kingfisher's food consists of small fish,—and it is a pretty sight to see them, with their brilliant colours, dart into the water,—and as they throw out the fish-bones after they have sucked out the juices, they make, with these bones, a curious and interesting nest. The



bones are glued together, and no other material is used. These nests are very difficult to get at, from the depth of earth in which they are deposited; and the instinct which leads the parent birds to do this is another proof of the care Providence bestows on His creatures. They are, in fact, very cunning birds, and have various ways of eluding those who are so ready to capture or destroy them: for this beautiful bird has many enemies; but Providence, as I have mentioned, has endowed it with peculiar instincts for its preservation.

When you consider what millions of quadrupeds, birds, reptiles, and insects there are in the world, it may well surprise you in reflecting on the care a superintending and wise Creator bestows on their well-being. He watches over the very smallest link in the whole scale of created beings, and His fatherly goodness provides for the preservation of the weakest and lowest of creatures. When severe frosts and heavy falls of snow lead insects to conceal themselves in secure retreats, they burst forth with the warmth of the sun in spring, and then we see them rejoicing, as it were, in their renovated existence.

It may amuse you if I were to give you some account of the lion-ant. This insect is formed something like the wood-louse, so that it cannot pursue ants, on which it feeds. But Nature, or rather, Almighty God, has endowed it with an instinct which enables it to procure its food. It makes a hole in the sand, and throws out all the finest particles of it to the top, thus forming a ridge which slopes downwards. This he does with his feet and his head. When all is completed, the lion-ant remains quite still and concealed at the bottom of the hole. If an ant comes to the brink it seldom fails of falling to the bottom, because the edge goes sloping, and the loose sand gives way under its feet, and thus throws it into the power of its enemy, who then feasts upon it. If the bank is hurt at the top, it is immediately put in order again. Indeed, all the actions of this little animal are so curious, and show such contrivance for providing for its subsistence, that it exhibits an interesting arrangement of Providence for its well-being.

I do not think that I have said anything to you in my lectures respecting the beaver, and yet they are most interesting and intelligent animals, found, principally, in North America.

They are about three feet in length, and the tail, which is covered with scales, is eleven inches long. Their tail is of great use to them, serving as a rudder when swimming in the water, and also as a trowel in plastering their habitations. In the month of June or July they assemble together to the amount of two or three hundred. They now begin to build an habitation, and their mode of proceeding is not only curious but wonderful, and shows what an extraordinary instinct has been implanted in them by a Divine Creator. They select some river which is subject to risings and fallings of the water. Here they build a bank across from one side to the other, often from eighty to a hundred feet in length, by ten or twelve feet broad. If they find on the margin of the river a large tree, they begin by cutting it down, in order to make the foundation of their dam. This is done by gnawing the tree through with their sharp front teeth, and in such a way that it is made to fall where they want it. They next cut the branches from the trunk to make it lie level. Some of the beavers then cut down smaller trees in the neighbourhood, about the size of a

man's leg, forming them into stakes. These stakes they sink down, and interweave the branches with the large stakes. Earth is then brought, which they plash with their feet and beat with their tails. Such quantities of earth are brought, that they fill with it all the spaces between the piles. These piles consist of several rows of stakes, all placed opposite to each other, and extend from one bank of the river to the other.

These operations are performed by the whole community. They then separate into smaller societies and build houses. Some of them consist of three or four stories. They are built very solid, and have two openings, one for the animals going to the land, and the other for throwing themselves into the water in case of alarm. The wood they use is generally that of poplars and willows, which grow near the stream, and which are light and tender, and each cabin has its own magazine of food. The floors are covered with box and fir branches, thus always looking green, and are kept perfectly clean.

This account of the society and operations of



the beaver might be extended to a much greater length. It is vouched for by many credible eye-witnesses, so that it need not be doubted. The skins of beavers are very valuable, and much sought after, so that the poor animals are sadly persecuted by the agents of the Hudson's Bay Fur Company.

In considering the various arrangements of Providence, with respect to the formation of the various creatures which exist upon the earth, I would draw your attention to the wisdom which has been shown. You know that some animals reside chiefly in the air, others on the earth, and others in the water; and yet see how wonderfully they are formed for their different modes of life. The wisdom with which an Almighty Creator has done this cannot be too much admired. Those birds, for instance, which seek their food in marshy places, have a long bill and long legs. Those who chiefly live on water have the lower part of their bodies very large, a long neck, web-feet, with much oil in their feathers. Hares and rabbits have full-set eyes, to enable them to see and avoid danger. The eye of the hen



answers the double purpose of telescope and microscope, enabling her to see the very smallest seed on the ground, and to discover birds of prey at a long distance. Some animals have both wings and feet, and some are without either, such as fish, which can move about with great rapidity, and have a bladder, by means of which they can rise and fall in the water at will. The formation of birds also shows a wonderful contrivance; their bodies, small and sharp before (like one of your boats), increase gradually. They can thus cut the air, as boats do the water. The feathers are all arranged with great skill, and are laid over one another in regular order. The wings are placed in the proper place, so as to balance the body exactly. The tail serves as a rudder to direct the flight, and helps the bird to ascend or descend in the air. Such are a few of the arrangements of a Divine Providence in the works of creation, and they ought to excite your wonder as well as your gratitude. Well may we exclaim with the Royal Psalmist, "O Lord, how manifold are Thy works! In wisdom hast Thou made them all. The earth is full of Thy riches."

But let me pursue the subject. You are no doubt aware that the shark has its mouth in the under part of its head, so that it can only catch its prey by turning its body upwards. Were it not for this, no fish could escape or avoid it, for it swims with great rapidity, and is very ravenous. This is another benevolent contrivance of the great Creator.

Fish are formed very differently from land animals. They have generally a slender, thin body, flattened at the sides, and always a little pointed at the head, which enables them to swim and cut their way better through the water. They are covered with scales of a horny substance, which preserve their bodies from hurt. Their fins may be called their limbs. By means of the tail-fins they move forward; the back-fin directs the motion of the body, and they raise themselves up by the pectoral or breast-fin; that of the stomach balances them. The gills are their organs of breathing. They are continually drawing water into their mouths, which is their mode of breathing, and they cast it out through their gills, which is their way of breathing it out again.

One of the organs most necessary to fish in swimming is the bladder of air in their stomach, by means of which they can make their bodies more or less heavy. Thus, when the air-bladder swells and extends, they become lighter, and can swim to the surface of the water, and when it contracts and the air is compressed, the body is heavier than the water, and consequently sinks down. You see how admirably everything is adapted for the element in which it moves.

And here I may mention that when the Doggerbank fishermen capture a cod, they immediately puncture a hole under the dorsal, or breast-fin, with an instrument something like a shoemaker's awl, and thus let the air out of the bladder. The fish is then transferred to a well under the fishing-boat, where it remains, with many others, incapable of motion, till her cargo is completed, when the vessel sails for England. On arriving in the Thames, it remains a short time in brinish water, and then is taken to the fresh water of Billingsgate, where the fish are sold as they are wanted. By looking at a Doggerbank cod in Mr. Hayllar's well-stocked

shop, you will see the mark of the puncture under the dorsal fin.

If a cat gets into a wood or prowls along hedge-rows, jays, magpies, blackbirds, &c., give warning of his presence by loud cries, thus making other birds aware that an enemy is near and is to be avoided. Birds, also, that assemble in large flocks, will place a sentinel on a high tree, while their companions are feeding below, to give notice of approaching danger.

The methods some birds will take for the preservation of their young are very interesting. Partridges and plovers will put on the semblance of being wounded, and flutter along the ground just before an intruder on their young till he has been drawn away from their haunt, the intruder thinking, probably, that he shall be able to capture the apparently wounded bird.

I have seen a cat on the top of a wall close to the nest of blackbirds with young ones in it. The old birds have flown against the cat with all their might, uttering loud screams of fear at the same time, until they have driven her away. It is impossible not to admire these instincts,

which tend to the preservation of feeble, helpless, creatures.

But it is time to conclude. My object in writing this lecture for you is to show you how wonderfully the Great Creator has not only provided for the wants of his creatures, but has formed them in a way best adapted for their peculiar mode of life. In fact, all the works of the Lord, from the greatest and most admired, to the meanest and most slighted, are great and glorious works, wonderfully contrived and as admirably made. Let us, then, adore the wisdom, and praise the kindness, of the Contriver and Maker of all the works we may see around us.

At the conclusion of this lecture, several of the fishermen were pleased to be able to testify, from their own knowledge, to the truth of the observations of the lecturer. And in answer to the remark of a gentleman, who said that the design of these lectures was to lead them to an admiration of the Great Creator, who had so wonderfully made all things, "Yes," said Mr. Jesse, "I recollect Professor Owen pointing out to me one



of the smallest insects that could be seen under the microscope, and saying he had no doubt that, if that insect were annihilated from the earth, the whole course of nature would be altered: so wonderfully had the Almighty made all things to fit in with each other."

## XIII.

ANECDOTES OF TIGERS, LIONS,  
GORILLAS, ELEPHANTS, &c.

My dear friends, I propose in this lecture to say something to you of tigers, leopards, and other beasts of prey in hot countries.

You have all heard of the kingdom of Oude, in India, and of its capital, Lucknow, where such fearful scenes took place during the late mutiny in that country. The King of Oude, before these events happened, was a weak and very depraved man, guilty of many cruelties, and governing his country in the most miserable manner. Amongst other fancies, he had one of collecting numbers of wild beasts and other animals in a park near his palace. Here might have been seen elephants, tigers, rhinoceroses,

antelopes, hunting-leopards, &c., sunning themselves in this park, either in their cages or on the grass. I must tell you that the king had a favourite tiger amongst these animals. It was an unusually large and beautiful one, and I am going to relate an anecdote of it which I think will interest you.

There happened to be a horse at Lucknow so savage that I question whether Mr. Rarey himself could have tamed him. When he got loose he killed several persons, and was called the man-killer. The king heard of him, and determined to have a fight between the horse and his favourite tiger. Accordingly, a large enclosed place was made and the horse brought into it, and shortly afterwards the tiger in his cage followed: the door of it was opened, and the tiger bounded into the yard, lashing his sides with his long tail and glaring furiously upon the horse. He had been kept without food or drink for a whole day, in order to make him more savage. He began to pace stealthily round the court-yard, while the horse in the centre of it turned as the tiger turned. At length the tiger bounded with the rapidity of lightning upon his enemy, but the horse was

fully prepared. It had evidently been the tiger's intention to seize the head and fore-quarters; but the horse was too adroit for that, for, by a quick motion of his head and shoulders, he received his antagonist upon his muscular haunches behind. The claws sank deeply into the flesh, whilst the hind-feet of the tiger made a grasp at the fore-legs of the horse, who threw up his hind heels into the air with tremendous vigour, and in a moment the tiger was sprawling on the ground. He was soon on his legs again, and paced round the enclosure as if nothing had happened. After a short pause he again sprang suddenly on the horse, who, however, was not taken by surprise. His head was lowered more than before, and again the tiger's claws dug deeply into his haunches, but further over. The broad round head of the tiger projected beyond the tail of the horse, whilst his hind claws were sunk deeply into the man-killer's breast. For an instant he might have been seen quivering unsteadily in that position, crouching with his belly on the horse's back and clinging to his prey; but only for an instant. Again did the ferocious horse lash up with his hind-feet, almost as if he would throw himself over on his

back. His heels came with crushing force against the tiger's jaw, and in a moment he was sprawling helplessly on the ground, stretched on his back. He soon, however, crawled away, evidently with no intention of renewing the fight, for his jaw was broken, and he gladly retreated into his cage as soon as the door was opened.

The same king had two enormous and fierce tigers, which he proposed to fight one against the other. Having been kept without food for two days, their cages were brought into an enclosed yard, and the doors opened. Out they bounded. One of them was called Ragra, the other Terai. They advanced towards each other step by step. At last Ragra made a sudden, rapid, and impetuous spring, for which Terai was not unprepared, for he jumped on one side, and immediately his claws were fixed firmly in the neck of his adversary, while his jaws were grasping his throat. Ragra, however, made a violent spring and freed himself, although his neck and shoulders bore bloody traces of the injury he had received. He now made another attack, and each succeeded in gripping his antagonist. With their mouths buried in each



other's throats, and their claws dug deeply into the neck, they rose to the contest on their hind-legs, straining, and tugging, and wrestling, as it were, with each other. They stood six feet as they thus grappled, their claws being firmly fixed in the neck on both sides, each bleeding freely. At last Ragra overthrew his rival, and got him beneath him on his back, but it was only for a moment. While the hind claws of Ragra were being fixed in the belly of his foe, the latter, who never let go his hold for an instant with his mouth, struck one of his fore-paws over the face of the other. The claws evidently pierced Ragra's eyes, and one of them was torn from the socket. He gave a howl of pain, and tried to free himself from the other, which, however, he was not allowed to do, for Terai clung to his throat, in which his teeth were deeply fixed, and then all at once he leaped from his prostrate position and got on the top of the other. The contest was now, in fact, at an end. Ragra, thus fallen beneath his foe and fast losing his blood, was unable to regain the advantage he had lost. Then Terai, thrusting one of his paws under the lower jaw of the other, forced back the head further until he had

fixed his teeth more deeply into the throat of Ragra, who was fast sinking under the victor's grasp and bite. On seeing this, the king ordered Ragra's cage to be opened, to which he escaped, the tigers having been separated by means of red-hot rods of iron; but the successful tiger was cruelly burnt before he would relinquish his hold. Such is a tiger-fight in India.

Another fight took place between two powerful elephants. One of them, named Malleer, had been victorious several times, but had had one of his tusks broken. Each elephant had on his back a mahout, or keeper, to whom they are generally very much attached, and who urge them on to fight. In this instance, the elephants attacked each other with the greatest fury, having had exciting drugs administered to them. Elevating their trunks, they rushed at each other impetuously, and the sound of their huge heads coming against each other might have been heard at a considerable distance. They then began to push against each other with their broad foreheads, head to head, and they were not separated for a moment. The mahouts, seated on the neck, at the same time were not

idle, for they are always jealous of the fame of their respective animals. They shouted with hearty good-will—indeed, with frantic energy—pricking them with a sharp pointed iron, called a peod, at the same time; at last the elephant called Malleer began to get the advantage of his adversary, who was retreating step by step. At length he was pushed to the bank of a river, which ran past the scene of the conflict, when he threw his vast carcass down the bank into it, and then swam off to the opposite side. Malleer was furious at this escape of his adversary. His mahout wanted him to follow, but he was too savage to obey. He was wild with fury, and looked round to see what he could attack. Just then his mahout lost his balance, and fell to the ground, right before the infuriated beast. In a moment, the huge creature put his foot on the man's breast and crushed him to death. Nor was this all. With his proboscis he first tore off one of his arms and then another, holding them up as the blood flowed from them. At this moment a woman, with a child in her arms, was seen rushing towards the elephant. It was the mahout's wife. "Oh! Malleer, Malleer!" she cried, "cruel, savage beast, see

what you have done! You have killed my husband, whom you loved so well; now kill me and his son!" The animal appeared to understand her; he took his foot off the body of the man, drooped his ears and hung down his head. The wife threw herself upon the body, lamenting loudly, turning now and then to the elephant to reproach him, while he stood, as if conscious of his fault, looking sadly at her. Once or twice the child caught at the trunk and played with it, as he had probably often done before,—for it is no uncommon thing in India to see the mahout's child play between the legs of an elephant, or to see the elephant waving his trunk over it, allowing it to go to a little distance and then tenderly bringing it back again, as tenderly as a mother would.

Some mounted spearmen were now sent to bring the elephant away; but he charged them all with the greatest fury, and drove them away, following them up.

"Let the woman call him off," shouted the king, who was present, "he will attend to her!"

She did so, and Malleer came back, just as a spaniel would do at the call of his master.

"Let the woman mount with her child and



take him away," was the king's order. It was communicated to her. The elephant knelt at her command; she mounted, and Malleer gave her, first, the carcass of her husband, and then her son. She sat upon his neck, in her husband's place, and led him quietly away. From that day she was his keeper or mahout. He would have no other. When most excited and most savage she had but to command and he obeyed. The touch of her hand on his trunk was enough to calm his most violent outbursts of temper. She could lead him without fear or danger herself, and the authority which she thus possessed her son would, doubtless, retain after her.

This is a true and interesting anecdote, written by an English gentleman who was present on the occasion, and it serves to show how a sudden ebullition of passion was repaired, as far as it could be, by the kindly feelings and affection of a sensitive animal, evidently aware that he had committed a great fault.

You may have heard a good deal lately about that extraordinary animal, the gorilla, and of M. Du Chaillu, who has brought several skins of it to this country, which I have seen. From



these skins, the length of a full-grown gorilla must have exceeded, in some instances at least, six feet, and their strength must have been enormous. Doubts have been expressed as to the accuracy of M. Du Chaillu's statements; but as I am acquainted with him, and have had some conversations with him on the subject, I can have little doubt as to his truthfulness. The honest and open expression of his countenance is also much in his favour. The following account of his meeting with one of these animals will interest you. He says:—

“While I was in the wood looking out for a gorilla, I heard a noise as of some one breaking down branches or twigs of trees. This was the gorilla, as I knew by the eager looks of the men who were with me. I examined my gun to see that all was right, and then we marched on cautiously. Suddenly, as we were creeping along, the woods were at once filled with the tremendous barking roar of the gorilla; the underbush swayed rapidly just ahead of us, and presently before us stood an immense male of this species. He had gone through the jungle on his all-fours; but when he saw us he erected himself, and looked us boldly in the face. He

stood about a dozen yards from us, and was a sight I shall never forget. Nearly six feet high, with immense body, huge chest, and great muscular arms, with fiercely glaring, large, deep grey eyes, and a hellish expression of face. He evidently was not afraid of us, but stood and beat his breast with his huge fists till it resounded like a kettle-drum. This is their mode of defiance, as roar after roar succeeded each other. He advanced a few steps, roaring all the time, and finally to a distance of about six yards from us, when we fired and killed him. With a groan, which had something terribly human in it, it fell forward on the face. The body shook convulsively for a few minutes, the limbs moved about in a struggling way, and then all was quiet. The blacks were ready to fight for the flesh of the gorilla, and were only pacified by the promise of its being divided amongst them. It seems to be a favourite food with them, although it savours much of cannibalism."

The following account of an attack of three lions on a wild buffalo in Africa may interest you. It is extracted from Dr. Livingstone's travels in that country :—

"We were riding one afternoon along the

banks of the Limpopo river, when a water-buck (a rare animal) started in front of us. I dismounted, and was following it through a jungle, when three buffaloes got up, and, after going a little distance, stood still, and the nearest bull turned round and looked at me. A ball from a two-ouncer crashed into his shoulder, and they all three made off. I followed as soon as I had re-loaded, and when we were in sight of the wounded buffalo, and gaining on him, three lions leapt on the unfortunate brute. He bellowed most lustily as he kept up a kind of running fight; but he was, of course, soon overpowered and pulled down. We had a fine view of the struggle, and saw the lions on their hind-legs tearing away with teeth and claws in most ferocious style. We crept up within thirty yards, and, kneeling down, blazed away at the lions. My rifle was a single-barrel, and I had no spare gun. One lion fell dead almost on the buffalo; he had merely time to turn towards us, seize a bush with his teeth, and drop dead with the stick in his jaws. The second made off immediately; and the third, raising his head, coolly looked round for a moment, then went on tearing and biting at the carcass as hard as ever. We

retired a short distance to load, then advanced and fired. The lion made off; but a ball that he received nearly stopped him, as it went clean through his shoulder-blade. He was followed up and killed, after having charged several times. Both lions were males. It is not often that two lions and a buffalo are *bagged* in about ten minutes. It was an adventure not to be forgotten."

On another occasion, Dr. Livingstone fired two shots at a lion he saw on a projecting rock. While he was re-loading his gun, he heard a shout. Starting, and looking round, he saw the lion just in the act of springing on him. He was on a slight elevation, when the beast caught his shoulder as he sprang, and both came to the ground below. Growling terribly close to Dr. Livingstone's ear, he shook him as a terrier-dog does a rat. Turning round to relieve himself of his weight, for the lion had one paw on his head, he saw the fierce animal's eyes directed to a man who was trying to shoot him at a small distance off. His gun, however, a flint one, missed fire in both barrels. The lion immediately left Dr. Livingstone, and, attacking the man, bit his thigh. Another man attempted to

spear the lion, and he caught him by the shoulders; but at that moment the bullets he had received took effect, and he fell down dead. The whole was the work of a few moments, and must have been the effort of dying rage. Dr. Livingstone suffers from his wounds to the present time.



## XIV.

## INSTINCT IN ANIMALS.

IT is my wish, in the lecture I am about to read to you, to draw your attention to the wonderful arrangements of a superintending Providence—or, rather, of an Almighty Creator—in the well-being of His creatures, from apparently the most insignificant insect to the larger animals. It is a subject well worthy of your consideration, and one which, I trust, will both instruct and interest you. Be quite sure that no religious doctrine is more strongly established than that of a superintending Providence, and that insects are a book, in which whoever reads, under proper impressions, cannot avoid looking from the cause to the effect, and acknowledging God's eternal power and goodness thus wonderfully displayed; and whoever beholds these

works with the eye of the body must be blind indeed if he cannot, and perverse indeed if he will not, with the eye of the soul behold, in all His glory, the Almighty Workman, and feel disposed, with every power of his nature, to praise and magnify Him.

In speaking to you of insects, I wish to call your attention to some facts which may serve to illustrate their wonderful organisation and peculiar instincts. Now, few things appear to me more curious than the knowledge implanted in female insects of the proper places in which to deposit their eggs. Moths and butterflies choose vegetables, such as cabbages, for this purpose, and on which the young caterpillars, when hatched, can feed; while bees, wasps, hornets, &c., make proper places for their eggs, and bestow great pains in doing so.

I have often watched a small wasp-like insect make a hole in sand, or a gravel walk, and then thrust a live caterpillar into it, depositing an egg in the caterpillar. The top of the hole is then covered up, and, when the egg is hatched, the new-born grub feeds on the caterpillar, till it assumes its perfect form, when it makes its way out of its prison. This may appear to

some persons a circumstance scarcely worthy of notice ; but I cannot but look upon it as a fact showing a beautiful arrangement of a Divine Providence for the well-being of His creatures.

There is a fly which lays its eggs on the skins of horses. Now you might suppose that these eggs, before they are hatched, might produce some irritation, which I believe they do, and that the horse would try to lick them off ; but the parent fly has that intuitive knowledge implanted in her, that she invariably deposits and sticks her eggs in that part of the horse out of the reach of his tongue, and thus the young flies arrive at maturity. I have mentioned instinctive knowledge, and you may ask what it is. I believe that what is called the instincts of animals — not reason — are those, to us unknown, faculties formed in them by the Great Creator, by which, independent of instruction, observation, or experience, they are impelled to perform certain actions, all of which tend to their well-being and the preservation of their species.

I will now tell you a curious and wonderful fact. There is a small fly which can move about in the air unwetted in a heavy shower of rain. You may suppose how keen must be its

sight, and how very rapid its motions, to enable it to steer itself between drops bigger than its own body, any one of which, falling upon it, would dash it to the ground.

Let us now look at the spider. Which of you fishermen can make a net as artfully woven, and more admirably adapted to catch its prey, than this insect? Again, what beast of prey would think of digging a pit-fall in the track of the animals which serve it for food, and at the bottom of which it conceals itself, patiently waiting until some unhappy victim falls into the trap? Yet this is done by a spider, and also by an insect called the ant-lion.

There is a beetle which rolls up pellets of dung, in each of which it deposits one of its eggs. In places where it meets with cow or horse dung only, it is under the necessity of having this work to do. But, in places where sheep are kept, this beetle very wisely saves its labour, and ingeniously avails itself of the pellet-shaped balls dropped by those animals.

I am going to tell you an extraordinary instance of instinct in bees. I should tell you that the queen-bee is the parent of all the bees in a hive, and they amount, in a well-stocked

hive, to about 35,000. Now, when a swarm takes place, and is hived, the working bees immediately begin to prepare cells, in which the queen-bee deposits her eggs. Some of these eggs produce drones, or male bees, and the greatest number working bees. It is, however, an interesting fact, that these latter seem to know what proportion of cells they are to provide for each sort, though the eggs are at the time in the inside of the queen-bee. She also knows in which cell a drone or working bee's egg is to be deposited, and when she comes to the cell of either of these there the proper egg is dropped. I have witnessed this operation in one of my experimental hives with great interest; and it seems to prove to me, as I hope it will to you, how wonderfully a Divine Providence has watched over the well-being of His creatures, and that nothing is too small, or apparently too insignificant, to be unworthy of His care, and, I might add, of His love.

Bees have a great variety of peculiar instincts, perhaps at least twenty, all of which, in different ways, tend to their well-being, and are very interesting. I will mention some of them.

When a young queen-bee is ready to leave a



hive, followed by a swarm, scouts are sent out in search of a proper place for her to settle on, or for a suitable abode. This is one instinct. Another is, for a certain number of bees to rush out of the hive after the queen that leads forth the swarm, and follow her wherever she goes. How these are selected for the purpose, for they are not all young bees, is a curious and mysterious fact. Certain it is, that if one of these should be put back into the parent hive, the day after it has left it, it is immediately killed as an intruder. When the swarm is hived, a third instinct teaches them to cleanse it from all impurities; a fourth, to collect a warm substance called *propolis*, and with it to stop up every crevice, except the entrance; a fifth, to ventilate the hive, which is done by a number of bees at the bottom of the hive fanning their wings very rapidly, which produces a current of cool air; and a sixth, to keep a constant guard at the door or entrance of the hive. Another instinct leads them to collect honey from flowers. They are also taught by instinct to avoid rain, returning in great haste to the hive if a cloud passes over

the sun, and flying there with great rapidity and as straight as a ball from a musket.

And here let me give a curious instance of instinct in an ass. This animal was shipped on board the *Ister* frigate, Captain Forrest, at Gibraltar, to be conveyed to Malta. The vessel, however, struck on some sands off the Point de Gat, at some distance from the shore, and the ass was thrown overboard, to give it a chance of swimming to land—a poor one, for the sea was running so high that a boat which left the ship was lost. A few days afterwards, however, when the gates of Gibraltar were opened in the morning, the ass presented himself for admittance, and proceeded to the stable of Mr. Weeks, a merchant, which he had formerly occupied, to the great surprise of that gentleman, who thought that, from some accident, the animal had never been shipped on board the *Ister*. On the return of that vessel to repair the mystery was explained, and it turned out that the ass had not only swum safely to shore, but, without guide, compass, or travelling-map, had found his way from Point de Gat to Gibraltar—a distance of more than 200 miles, which he had never tra-

versed before—through a mountainous and intricate country, intersected by streams, and in so short a period that he could not have made one false turn. His not having been stopped on the road was thought to be owing to the circumstance of his having been formerly used to whip criminals upon, which was known to the peasants of Spain, who have a great horror of such asses, by the holes in his ears, and to which the persons flogged were tied. This curious anecdote of instinct was told me by my late friend, Edward Hawke Locker, Esq., who was at Gibraltar at the time, and was Secretary to Lord Exmouth, the Commander-in-Chief of the Mediterranean squadron.

But to return to the instincts of bees, one of which leads them to collect honey from flowers, even as soon as a young bee leaves the hive for the first time. Another instinct leads them to prepare royal cells, and to bring up young queen-bees by a peculiar mode of feeding them, thus converting a working-bee grub into a queen. It is also a curious fact that, when cells are wanted, the bees construct them, not leaving the hive to collect honey. At other times, each bee appears to have its different work to perform.

Some are collecting what is called pollen—a peculiar food for the young bees; others are in search of honey. Some are busied at home in the construction of cells; others in giving them a polish; others in ventilating the hives; and some in feeding the young brood.

But it would occasion this lecture to be of too great a length if I were to enumerate all the various instincts of these extraordinary insects. Almost similar ones may be found in colonies of ants, and amongst wasps and hornets, and, indeed, in all the insect tribe. The Psalmist tells us that “the tender mercies of God are over all His works;” and so we shall find it to be the case if we examine into them. Thus, as I have endeavoured to point out to you, not even the least and most insignificant of His creatures is deprived of His parental care and attention; each is under His directing Providence. Then why should we ever doubt that a Being, whose very essence is *love*, will ever deprive us of His care and Providence, unless by our own wilful wickedness? Again, if we were to look at the internal structure of insects, as seen through a microscope (and I have brought some delineations of them to show you),

you will see how wonderfully and beautifully they are formed for the purposes for which they were designed. Having thus placed before your eyes, for your entertainment and instruction, a representation of the external structure of some insects, I think you will be disposed to own, that in no part of His works is the hand of an Almighty and All-wise Creator more visibly displayed, as they all reflect His glory, and are constantly employed in working His will. Think of what you have heard, and may God bless you all !



## XIV.

INSTINCT OF SOME OF THE  
SUPERIOR ANIMALS.

MY dear friends, I am going to read you a lecture on the habits of animals generally, and hope it will amuse you. One of my objects is to do so, and another to instruct you. In fact, the instincts of animals, their contrivances, their architecture, their forethought, their affections, and various other circumstances connected with their several modes of life, are indeed lessons of instruction to every one. They show the goodness of the Great Creator. They serve to prove the truth of what the Psalmist said, "The eyes of all wait on Thee, and Thou givest them their meat in due season." If the most insignificant little living creature is viewed through a micro-

scope, it will be found to be most exquisitely formed, and to possess all those functions which are necessary to its well-being. I wish to impress this strongly on your minds, that you may be able to view Almighty God in His works, and thus learn to love and admire Him as the Author of all good. Having stated this, I will now proceed to give you some curious instances of instinct amongst what are called the inferior animals, that is, of animals which are supposed to be almost without sense or power of motion.

You are all of you acquainted with the common sea-hog, or sea-egg. To look at it you would suppose it to be without sense, or the possibility of regarding external objects by sight or hearing; yet it will travel up the rods of a crab-pot, enter the opening, descend within, mount again to the situation of the bait, and choose the one which pleases it best.

Again, the star-fishes seem very inactive and without intelligence, yet they display sagacity in the discovery and choice of food, as well as in the manner of seeking it, and also alter their habits in different seasons.

You might suppose that cuttle-fishes were without any sense, and yet they show some

degree of curiosity by their moving up to a shining object to examine it; and, when in danger, they become suddenly suffused with a decided blush of red, and then eject the contents of their ink-bag, by which they become concealed from observation.

The oyster closes its shell when it comes in contact with some objects, and opens it on the flowing of the tide, so that its structure is wonderfully adapted to the wants and circumstances of a creature so apparently unconscious of a want, or, if it had one, so incapable of supplying it.

But let me turn to a higher order of animals; and I will begin with birds, and their instinct of migration. You are aware that numbers of birds arrive in this country in the spring from far-distant regions, flying over immense tracts of land and sea in one unerring line, and generally doing this in the night. This instinct induces them to seek a warmer climate at one season of the year, and a colder at another. It cannot be supposed that the old birds lead the young ones in these migrations, for it has been ascertained that late broods have taken their flight long after their parents have departed.

Indeed, the young cuckoo has never known a parent's care, since it is brought up in the nest of some other bird ; yet it leaves this country long after others of the same species, being then a solitary individual, and finds its way to the groves of Greece and the sunny regions of Italy. Now, it is quite clear that this extraordinary migratory instinct must have been implanted in this and various other birds by a merciful Creator for purposes intended for their well-being in climates congenial to their respective wants. And then with what pleasure may we listen to the songs of numerous warblers which arrive amongst us in this blessed country, the nightingale being amongst them, cheering us with their music, and proclaiming the loving-kindness of our heavenly Father !

But this migratory instinct is not confined to birds. The extensive plains of North America were formerly more frequented by vast herds of buffaloes than they are at present, in consequence of the destructive attacks made upon them, not only by the Red Indians, but by the American settlers. At certain periods a strong migratory impulse seizes upon those great herds, and they rush along the plains, cross rivers,

ascend hills, and go in one undeviating line to some far-distant locality, overturning tents and other obstructions in their way. So it is also with the land-crabs of Jamaica. When the season arrives, they quit the upper country and make a rush towards the sea-shore in a direct line, and nothing stops their progress, so strong is the migratory instinct.

This extraordinary impulse is also possessed by some insects. In Australia a migratory procession of caterpillars may frequently be observed. They travel in single file, having a leader; and each is so close to its predecessor as to convey the idea that they were united together, moving like a living cord in a continuous line. If one caterpillar should be taken from the middle of the line, the one immediately before him suddenly stands still, then the next, and then the next, and so on to the leader. The same takes place at the other end of the line. When the caterpillar which is removed gets into the line again, the whole move forward as at first, thus apparently having some means of communication with the leader. This was not a solitary experiment, but has been repeatedly tried during the progress of these insects, and proves the



extraordinary fact of the power of communication existing amongst them.

Quails have a strong migratory instinct, and so regular is their arrival in the island of Malta, that the day of their coming is noticed in the published calendar of the island, as the change of the moon is in ours. A great flight of storks also takes place annually in the Mediterranean, about the same period of the year; and I was assured by the captain of a ship, who was engaged in making surveys on the coast, that those young birds which were incapable of performing so long a flight during the migratory impulse, were conveyed on the backs of their parents to far-distant places, some of them making their way into Persia.

One of the most curious instances of migration is in the case of the heron. Heronries are not very common in England, and certainly there are not any within some miles of Richmond Park, in Surrey. Yet year after year (for I reside in the neighbourhood) I have seen from fifty to sixty herons assembled on a large open space in that Park, not moving about or seeking for food, but appearing as if they had met together to consult on some important subject.

What their object was I never could even guess at; and it must be some extraordinary instinct which brings them thus together, especially as no heronry has so many of these birds belonging to it, so that the assembly must consist of several heronries.

It is an interesting fact that instinct leads migratory animals in general to pursue one invariable direction in their passage from one distant country to another. They have neither compass nor guide, and yet they rarely deviate to any great extent in their journey. Mountains and wide seas intervene, and yet young and old find their way. Inscrutable as this instinct may appear to our dull perceptions, it is implanted in His creatures by a wise and good God, who leads even the little, feeble insect-hunting birds to go remote distances from their homes to seek for that food which they require. Indeed, their rapid flight proves that they have a conscious security of finding it. A lady told me that while cruising in her husband's yacht in the wide seas of South America, she witnessed a migration of butterflies, which were far distant from any land, and on a subsequent occasion a migration of humming-birds. Change of weather,

no doubt, produces migratory impulses,—a fact which some of you fishermen are acquainted with.

Some few years ago, immense cloud-like swarms of dragon-flies passed in rapid succession over a town in Germany. Their progress was from south-by-west to north-by-east, some flying high and others low, and they struck against the windows of houses situated on eminences. We are not visited in this country by locusts, which commit such vast injuries on crops in the East. When the migratory impulse is on them, they swarm in vast numbers, taking long flights, and sometimes alighting in the sea and perishing.

Some animals change their quarters (it may be called migration) for unaccountable reasons. For instance, the badger, which is a solitary animal, and once very numerous in this country, would assemble to the number of nine or ten, and travel by night to some other locality. If any one happened to disturb them in their progress, he was attacked with the greatest ferocity, although when single they are perfectly harmless. Rats and mice are also known to migrate; but always by night. Speaking of rats, I may tell you that a gentleman in Hertfordshire laid up

about two bushels of walnuts, and on the following morning he found that they had all been carried away by rats.

But I shall tire you if I were to continue longer the subject of instinct in animals, although I might pursue it to a great extent. In many cases it amounts so nearly to reason, which latter faculty is supposed to be possessed only by the human race, that it is difficult to define where instinct begins and reason ends. You may judge for yourselves when I give you the following anecdotes.

A fox, partly tamed, was kept fastened by a chain to a post in a court-yard, and was chiefly fed on boiled potatoes. Many fowls also were kept in the same yard, but had sense enough not to come within reach of the fox. He was, however, too cunning for them, as you will find. Having bruised and scattered the boiled potatoes which he had received for his dinner at the extremity of the space the chain would reach, he retired in an opposite direction, and put on the appearance of being asleep. His cunning succeeded, for some of the fowls were thrown off their guard, and came within the circle of danger to eat the potatoes. The fox then sprang



upon them and seized his prey. Was there not some degree of reason in this?

Again, an old man was one day walking on the banks of a river, when he observed a badger moving leisurely along the ledge of a rock on the opposite bank. In a little time a fox came up, and after walking some distance close in the rear of the poor badger, he leaped into the water. Immediately afterwards came a pack of hounds in pursuit of the fox, who by this time was far enough off, floating down the stream, but the unfortunate badger was instantly torn to pieces by the dogs. Here was cunning combined with reason. A fox has been seen to drop the end of his tail among rocks on the sea-shore in order to catch the crabs below, hauling up and devouring such as laid hold on it.

I will now give you an instance of what might be called reason in a dog, and which occurred in this town. A lady, proceeding to the house of one of her pupils, near Brunswick Place, had her cloak seized by a dog, that pulled her the contrary way to which she was going. As she could not disengage herself, she permitted herself to be led till she was brought to the open space at Wick, when she became alarmed



and asked some men to drive the dog away. They persuaded her to see where the animal would lead her, promising to protect her if necessary. He brought her to a house which was then in the course of erection, and began to scratch at the end of a plank, which was laid across the open unfinished area of the house for the workmen to get into it. The plank was lifted up and a beef-bone found under it, which the dog seized and ran away with. This dog belonged to an excellent, charitable clergyman at Wick, who told me the anecdote after he had taken some pains to ascertain its accuracy, so that it need not be doubted. It is a curious instance of a reasoning faculty in an animal; but I must now conclude.

You will recollect that I have given you several lectures on Natural History, and I wish you to consider them, not as a mere gratification of curiosity, or as vehicles for amusing anecdote, but as affording proofs of a Superintending Providence, and of the care bestowed on all the works of creation by a Being infinite in power, wisdom, and goodness! Indeed, he must be wilfully blind who does not observe Divine interposition, not only in human affairs, but in every-

thing connected with the animal and vegetable creation. With respect to the vegetable creation, I may tell you that if potatoes are put in a cellar and the least ray of light admitted, the shoots of that vegetable will move in a direct line to that light. Again, if the root of a plant is uncovered, without exposing it to too much heat, and a wet sponge is placed near it, but in the opposite direction from that in which the root is proceeding, you will see the root turn towards the sponge, as if wanting to imbibe its moisture.

Lastly, place an upright pole near an unsupported vine which is growing in an opposite direction to the pole, it will quickly alter its course, and stop not until it has fixed itself to the pole. These facts may excite our astonishment, but they should, at the same time, produce in us feelings of gratitude, and, I may add, of confidence towards that benign Being who supports us as well as the humble vine, and showers down His blessings upon us.

## XVI.

## INSTINCTS AND HABITS OF BIRDS.

You seemed pleased with my lecture on the Cuckoo, and therefore I propose, in my present one, to talk to you a little of some other birds whose instincts and habits are curious, or are remarkable for their song and the beautiful structure of their nests. I may also tell you that the birds of the air distinguish the proper times and seasons, and choose the fittest places in which to build their nests; and they are made with such skill and exactness that no human art could form one like them. Then, as to their song. Recollect that the music of birds was the first song of gratitude and thanksgiving which was offered on earth before man was created. This song is various, but always harmonious, and composes a choir which we

cannot imitate. And here let me repeat a short sentence which may be found in good old Izaak Walton's "Complete Angler." He was, like myself, a dear lover of the country, and an admirer of all God's creations. He remarks, in speaking of the nightingale, "He that, at midnight, when the very labourer sleeps securely, should hear, as I have done, the clear airs, the sweet descants, the natural rising and falling, the doubling and redoubling of the nightingale's voice, might well be lifted above earth, and say, 'Lord, what music hast thou provided for the saints in heaven, when thou affordest bad men such music upon earth?'" I need not tell you that it is in the calm of an evening in the spring that the nightingale—

"Warbles his delicious notes,  
As he were fearful that an April night  
Would be too short for him to utter forth his love-  
chant."

I will now mention a favourite bird of mine, not for its song, but for its curious habits. It is called the nut-hatch, for it is able to break both nuts and filberts, in order to get at their kernels. It is about the size of a sparrow, and can run up and down trees with great quickness,

so that it appears like a mouse. It builds its nest in a hole in a tree, and it is plastered round with clay, leaving only sufficient room for itself to pass in and out. A gentleman of my acquaintance saw this operation on one of his trees; and when the birds had finished their plastering, a pair of starlings came and pecked away the clay, and took possession of the hole. The poor nut-hatches were in despair, flying backwards and forwards, when my acquaintance nailed some pieces of wood on each side of the hole, and made it too small for the starlings to get in, so the nut-hatches brought clay and completed their nest. If one is caught and put in a cage it will hammer with its beak on the woodwork all day and all night, till it is exhausted and dies. No persecution will force this little bird from its habitation when sitting. It defends its nest to the last extremity, strikes the invader with its bill and wings, and makes a hissing noise, and, after every effort of despair, will suffer itself to be taken in the hand, rather than quit. It is no uncommon thing to find in the crevices of the bark of an old tree a great many nut-shells. It fixes the nut firmly in a chink, and pecks at it till it has broken it. It



has a remarkably loud, shrill whistle, and is called, in some counties, the nut-jobber.

The nest of the goldfinch is exceedingly curious, and it is generally lined with the down from the willow. This bird is very easily tamed, and I have seen it perform some wonderful tricks. Some years ago a German came to this country, and brought some of these birds and exhibited them. One appeared dead, and was held up by the tail or claw without showing any signs of life; a second stood on its head, with its claws in the air; a third imitated a Dutch milk-maid going to market, with pails on its shoulders; a fourth mimicked a girl looking out at a window; a fifth appeared as a soldier, and mounted guard as a sentinel; and the sixth acted as an artilleryman, with a cap on its head, a firelock on its shoulder, and a match in its claw, and discharged a small cannon. The same bird also acted as if it had been wounded. It was wheeled in a barrow, to convey it, as it were, to the hospital, after which it flew away before the company. The seventh turned a kind of windmill, and also stood in the midst of some fireworks, which were discharged all round it, and this without showing the least

symptoms of fear. I myself have seen two canary-birds placed on a table, one with a lighted match in its foot, with which it fired off a small cannon at the other, which fell down as if it were dead, and remained so for some time, and then rose up quite merry. I have reason to believe that these birds are taught without any cruelty: indeed, I should be sorry to think that any was inflicted on them.

I must confess that the sparrow is a favourite bird of mine, not for his song or his beauty, but because he is a sort of domestic bird, inhabiting the dwellings of both rich and poor, but preferring the humble thatched cottage to a palace. It is said of some waterfowl that they always remain within soundings, thus warning the mariner of his approach to land; so, if a person lost himself on a dreary mountain, and saw a sparrow, he would know that he was near some habitation.

Sparrows are very affectionate birds; they have been known to feed the hungry and deserted young ones of other birds. On one occasion a sparrow got his feet entangled by a piece of string, which he had carried to the eaves of a house, and was unable to extricate

himself. In this condition he must have been starved, had not his companions regularly fed it till it was released.

Farmers foolishly abuse sparrows, but they do an infinite deal of good. It has been pretty accurately calculated that, when they have young to feed, they destroy, on an average, every week 3360 caterpillars. They also destroy many slugs and other insects.

Sparrows may be seen in the streets of London nearly all the year round; but in the autumn, when the harvest is over, they assemble in large flocks in the stubble-fields around the metropolis, where they get fat on the scattered grain.

Sparrows are, on several occasions, mentioned in the Holy Scriptures. Thus, for instance, in the eighty-fourth Psalm, "The sparrow hath found an house, and the swallow a nest for herself, where she may lay her young, even Thine altars, O Lord of hosts, my King and my God," and which has been thus beautifully versified:—

"The birds, more happy far than I,  
Around thine altars throng,  
Securely there they build their nests,  
Securely rear their young."

Every lover of Nature must rejoice in the first appearance of swallows in the spring. They proclaim the approach of summer—of flowers, and fruits, and warm, mild weather, and of the season for herrings and mackerel for you fishermen. My eyes are ever open—and I hope will be so as long as I live—to the beauties of Nature, and therefore I am always pleased at watching the happiness of the swallow tribe. They, indeed, live a life of enjoyment. Winter is unknown to them, and, on its approach, they quit this country for the groves of Italy and the sunny climate of Africa. The instinct which leads them to do this is wonderful, and they make their way over seas and continents in one unerring line to the places best adapted for their well-being. The swallow should always be considered as a sacred bird and a friend to man, for it destroys numerous insects which might otherwise become a nuisance.

“Gentle bird ! we find thee here :  
When Nature wears her summer vest  
Thou com'st to make thy simple nest ;  
And when the chilling winter lowers,  
Again thou seek'st the genial bowers.”

The confidence which swallows show to the

human race is not a little extraordinary, and entitles them to the protection of man. I have found their nests in extraordinary situations. I had once occasion to call on a friend at Pipe Hall, in Warwickshire, and saw a swallow's nest fixed to the knocker of the door. On ringing a bell the door was opened, when the bird left its retreat, but I was assured would return to it immediately. I have seen a nest under a low door-way, under the eaves of a low cottage, and against the wall of a tool-shed. When they are preparing to migrate, they assemble by many thousands on particular spots. I have seen the large roof of the tennis-court at Hampton Court Palace covered with them, and also the willows on the little islands in the River Thames. Last autumn I saw the telegraph wires, nine or ten in number, which cross that river near Maidenbridge, completely covered from one end to the other with sand-martins. The next day not one was to be seen.

It must be an extraordinary instinct which leads swallows to congregate from various remote districts to a particular locality, and then to migrate with one accord, old as well as young.



Indeed, they must be taught by an Almighty Power to do this, proving that the eye of Providence is always directed to the well-being of His creatures. Well may we admire and wonder.

Amongst the birds which arrive in this country in the months of April and May may be reckoned the cuckoo, the wryneck, and also about forty little tender birds, many of them songsters, and which encounter the perils of a long flight over land and seas, impelled by a migratory instinct. Most of these arrive in the night, and I cannot doubt but that this is ordained for their benefit, for if they came in an exhausted or tired state on our shores, they would be less able to conceal and protect themselves. The males arrive first, and then their songs begin. After a few days the females arrive, and, hearing the songs of the males, they pair and begin to build their nests. It may be mentioned that almost all our summer birds of passage come from warm climates, and our winter birds from cold regions, such as woodcocks, snipes, &c. That interesting bird, the short-eared owl, generally arrives in this country with the woodcocks. I found one of these birds, some years

ago, on the Brighton Downs, squatting on the ground like a hare in her form. It lay close, and when disturbed only flew a short distance. Their eggs have been found in rabbit burrows.

One of my favourite birds is the kestrel, not only for its graceful motions in the air, but for its handsome shape and pretty plumage. It is also a most useful bird to farmers, if they would but think so, destroying mice, cockchafers, grasshoppers, and many other injurious insects. It is to be regretted that game-keepers destroy this graceful bird, as they invariably do. Providence creates nothing but for some good purpose, and landlords and farmers are little aware of their own interest when they cause the destruction of animals which have been sent for their benefit, especially those which feed on grubs, mice, and insects—for instance, the kestrel, rooks, owls, moles, &c. This subject cannot be too strongly impressed upon every one—I mean, the care which an Almighty Creator has shown in the well-being of His creatures. What wonderful skill is bestowed upon the smallest animal and plant, as well as the largest! This is the case with animals in the sea as well as those on land. An eminent

and most observant Sussex naturalist has remarked, that “the very jelly-fish, as it swims in the wave, expanding and contracting its umbrella, and thus propelling itself through the water, has its beauty; but few are aware of the singularity of its history—how its eggs are of the nature of seeds, which, sown on their rocky bed, sprout and grow, throwing out buds and suckers, each of which forms an animal stem, quite unlike the parent jelly-fish, till, at a certain time, young jelly-fish begin to be formed and to be thrown off by the several branches, just as flowers are formed and expand on the several branches that come from a vegetable seed.”

I have quoted this passage, as I wished to draw your attention to the interesting objects to be found in the sea, as well as to those on land. Be quite sure, that the more you reflect on the works of God, the better men you will become. You will then learn to love Him for His goodness, and to feel that if He bestows His care on little insignificant birds and insects, He will also care for you. May He bless you all!

## XVII.

## . THE UTILITY OF BIRDS.

MY DEAR FRIENDS, I am going to talk to you this evening on the benevolent design of Providence in ornamenting and enlivening the world, as He has done, with a great variety of birds. In telling you this, I ask you to bear in mind not only that it has pleased Almighty God to cheer us with their songs, but He has also created them for many useful purposes, some of which I will point out to you. Before, however, I do this, I wish to make one remark, which has occurred to me while writing this lecture for you. It is this. When I have looked on beautiful scenery—when I have seen the wooded valleys standing thick with corn, and the river winding and sparkling as it flows—when I hear the sweet songs of birds, and look at the great variety of

pretty flowers which cover the earth, I am almost ready to exclaim—"Surely this world is thus adorned for me, not by a mere Master, but by a Father, and that a loving Father." Suppose, now, you were going to fit up a cottage for a servant, you would think of his health and his comfort; but for whom would you provide flowers, and paintings, and singing birds, and other tokens of regard? Only for a child, or for one whom you loved. Bear this in your minds, and never do anything to grieve or draw away the affections from you of so good and loving a Father, who has done so much for you.

Now let me say something to you as to the utility of birds. A gentleman lately told me that, in a district with which he was well acquainted, war was waged against all sparrows, for some foolish reason, until they were nearly extirpated. The consequence was, that there was so great a plague of caterpillars, slugs, &c., that the fruits of the earth were destroyed; and now the silly people have found out their mistake, and are introducing sparrows as fast as they can. It is supposed that sparrows breed three times a-year, and that each nest of young sparrows will consume at least 6000 caterpillars,



so that we have the result of 18,000 caterpillars for the three broods, besides what the old birds eat themselves.

I have seen a field of wheat nearly eaten up by rats, which swarmed in the banks along the hedge-rows. The landlord was a sportsman, and had ordered his keepers to destroy all vermin, as they are called, such as stoats, weazels, hawks, owls, &c., forgetting that rats are more destructive to game than any of these, besides injuring his tenant's corn.

You may have seen, on the Brighton Downs, flocks of chaffinches and other gregarious birds,—that is, birds that assemble together, in winter. These do a wonderful degree of good to the farmer, by picking up the seeds of weeds, which would otherwise grow and give him much trouble in clearing his land.

Let us now turn to the swallow tribe, of which we have four species in this country. When they arrive in the spring, you may see them on the wing from early in the morning until late in the evening, busy in catching flies and other insects, which, without the agency of these birds, would increase to a great and injurious extent. You know that hops are planted in rows. Well,

in a large hop-yard in Herefordshire, some young farmers and their friends amused themselves by practising to shoot flying, by firing their guns at the swallows which flew between the rows of hops, and thus killed or drove them away. The consequence was, that the whole of these hops were nearly destroyed by insects, while all the neighbouring hop-grounds had large crops the same year. The inhabitants of houses against which swallows build their nests are seldom troubled much with gnats and flies, besides which they have the pleasure of hearing the sweet twittering of those birds on their roofs. So perfectly aware are the inhabitants of North America of the utility of swallows, that they scoop out gourds, fix them on poles near their residences, and in these swallows build their nests, and form large colonies. Should any marauding hawk attack the poultry in the farm-yard, the swallows congregate and fly at the head of the enemy with so much courage and perseverance, uttering their wild screams at the same time, that the culprit is glad to make a hasty retreat. Besides this, they destroy numbers of noxious insects. In America, therefore, swallows are protected, instead of being molested

and fired at, as they too often are in this country by way of amusement, and a wanton and cruel one it is.

Pheasants are often objected to by farmers as injurious to their crop of wheat, whereas they are amongst the best friends the farmer has, devouring immense numbers of wire-worms and grubs. Partridges, also, clear away many obnoxious insects from land.

But, perhaps, the rook is the best friend the farmer has, although, till of late years, they were cruelly destroyed, and dead rooks might have been seen suspended on sticks, in wheat-fields, to drive away or frighten these birds from coming on it. The farmers, in many counties, have now found out their mistake. They see rooks following their ploughs, as the soil is turned up, and devouring the larvæ of cock-chafers, wire-worms, and other insects which feed on the roots of newly-sown wheat. Nor is this all the benefit they confer on the farmer. As the grain springs up, they search for and devour those plagues of the farmer, the wire-worms, leaving the sprouting grain untouched. This has been proved by examining the crop of a rook, in which no wheat was found, but

numerous wire-worms. The grub of the cockchafer, as has been said, is very destructive to crops of grain. The female of this insect drops her eggs in considerable quantities in the ground. These, the next year, hatch, and become small grubs, and continue to increase in size for two years afterwards, all this time feeding on the roots of grain, or those of potatoes, turnips, &c. These grubs are the favourite food of the rook, who searches for and eats them. It is a curious fact that at the end of the third year, and when they have become perfect insects in the spring, and ready to quit the earth to feed on the leaves of oaks, hazels, &c., they have a sort of instinctive knowledge when the leaves are on those trees; and in a late spring they remain in the ground until the leaves appear. As they settle on them, and begin feeding, you may see numbers of rooks busy in devouring them, thus conferring additional benefit on the farmer. In fact, but for this destruction, cockchafers would become an enormous evil to him.

Some few years ago the turf in many places in Greenwich Park turned brown, and, in fact, was killed. It then appeared that this was occasioned by myriads of the grubs of an insect



you well know, called the daddy-long-legs, which ate the roots of the turf. Now, this park is frequented from morning till night by numbers of Greenwich pensioners, so that the rooks were disturbed when they came to feed on the grubs. The consequence was, that a considerable expense was incurred by turning and burning the turf, covering the ground with lime, and sowing it with grass seeds.

In addition to the utility of the rook, I should mention their social habits, living together in large communities, and pleasing every lover of Nature, as they do, with their varied flights, and harsh, yet pleasing notes. In fact, they add greatly to the pleasures of a country life.

The owl must not be omitted in the list of useful birds, although, alas! it has been recklessly and wantonly destroyed by keepers, and, consequently, is not so common in this country as it formerly was. It is a pretty sight to see it on a moonlit evening, flying along hedgerows and quartering fields in search of mice, numbers of which it destroys, but never, I have reason to believe, young pheasants or partridges.

The goldfinch must also be noticed as a useful



bird to farmers. In the winter it may be seen in small flocks, settling on thistles, the seeds of which it feeds on, and thus prevents the spread of these useless plants over the adjacent fields. Various kinds of linnets also have their respective uses by eating the seeds of noxious weeds.

You are all of you aware of the great utility of the common domestic fowl. To say nothing of a roasted chicken and egg-sauce—no bad things—we are indebted to them for good puddings, pancakes, and poached eggs and bacon, besides feathers for our beds, and, indeed, many other luxuries. Then there are varieties of birds which are useful for food, such as pheasants, partridges, grouse, woodcocks, turkeys, geese, ducks, pigeons, &c., and I might mention others in various parts of the globe.

Sea-birds settle on rocks and roost there, and, in process of time, their manure accumulates in enormous quantities, so that many vessels are employed in collecting and bringing it to this and other countries, where it is found to be a most useful and valuable manure, called guano. Many cliffs and coasts are covered also with the droppings of birds, so as to render them capable of producing useful plants. Nor is this all, for

it is well known that wild ducks, in their migrations, carry impregnated spawn into remote ponds, &c., and in this way stock them with fish.

The solan goose, or gannet, is the principal food of the poor islanders of St. Kilda, off the coast of Scotland. They not only preserve these birds in great quantities for winter use, but they eat their eggs, and women wear their skins instead of shoes. Indeed, the entire skins of sea-birds are used for the clothing of many Northern nations.

The cormorant is a very useful bird in China, where it is in common use in taking fish.

The down of the Eider-duck is of great value, as is well known, and is an article of commerce.

The vulture is a most useful bird, in hot countries especially, where it feeds on carrion, and destroys immense quantities of lizards, snakes, rats, mice, &c.: for this reason it was considered a sacred bird amongst the Egyptians.

You thus see what extremely important creatures birds are in the economy of Nature. They destroy, as you have heard, innumerable insects, and the thoughtless extirpation of some birds supposed to be injurious to fields and

gardens, such as rooks, sparrows, &c., has generally given rise to an infinitely more prejudicial multiplication of destructive vermin. You may be quite sure, then, of one important fact from what you have heard. It is this. An All-wise Creator has so beautifully and beneficially arranged everything in this world, that all tends to one universal good. I have endeavoured, in some of my former lectures, to impress this truth upon you. It should never be lost sight of; and be assured that the more you see God, as manifested in His works, the more you will be led to admire and love Him.

Let me conclude my lecture to you on the utility of birds by reminding you that the pen with which I wrote it was plucked from the wing of a goose; and do not forget, when you are reposing in peace and warmth on your beds, that the same bird has probably, by its feathers, contributed to your comfort. And when Michaelmas-day arrives, let me hope that you will be reminded of your old and affectionate friend, as each of you sits down with your wives and children to partake of a good fat goose and apple-sauce, which all may afford to do who are depositors in a savings'

bank, and keep away from beer-shops and ale-houses.

Since writing the above, I may mention that the French have been in the habit of killing and eating every bird they are able to destroy, from a goose to a magpie; even swallows and redbreasts do not come amiss to them. They have at last found out their mistake, from the great injury done to their crops by various insects and caterpillars, which birds would have kept down, had they not been destroyed; and means are now being adopted to encourage the breed of small birds in that country.

## XVIII.

## ON THE JAPANESE.

MUCH interest is now excited respecting the Japanese, their country, and habits; and what little we have known of them until of late years has chiefly been derived from the Dutch, who, however, had but few opportunities of penetrating very far into their country. That the Japanese and the Chinese are of the same race cannot now be doubted. Their colour is indeed darker, because they inhabit a more southern climate; but, like the Chinese, they are haughty, vain, and inconstant, but at the same time occasionally civil and obliging. Like them, also, they will sustain hunger, thirst, cold, heat, and other hardships. Like them, they eat their food with chopsticks. The custom of rendering the feet of their females so small that they can



with difficulty support their bodies is common to both nations. Indeed, every woman who wishes to be thought handsome must have her feet so small that they can easily enter the shoe of a child of six years of age.

The best and one of the most recent accounts of Japan is to be derived from a report made by Commodore Perry to the American Senate. He commanded a small squadron sent by the American Government to take presents to, and establish commercial relations with, the Japanese. His report is highly interesting, and accompanied by numerous coloured drawings of the scenery, habitations, customs, and natural history of the country. He appears to have met with but few hindrances in his inspection of it; and on presenting his report to the American Senate, they had it printed for themselves in three thick quarto volumes, fully illustrated. It is, in fact, so expensive a work that it is almost as little known in America as it is in this country. As I, however, happen to possess a copy, a few extracts will be made from it which cannot fail to be interesting to you.

Amongst the American presents which chiefly

excited the curiosity and astonishment of the Japanese was a Lilliputian railway, perfect in all the parts of its mechanism. The car was only large enough to convey a child of six years of age, which it did with considerable velocity round an extensive circle. A dignified mandarin, however, insisted on getting on the roof of the car, clinging with a desperate hold to the edge of it, grinning with intense interest, while his huddled-up body shook convulsively with a kind of laughing timidity.

Nor did an instantaneous telegraph excite much less interest. The wires were conveyed to the distance of a mile. When communication was opened up between the operators at either extremity, the Japanese watched with intense curiosity the *modus operandi*, or the way of working it, and were greatly amazed to find that in an instant of time messages were conveyed in the English, Dutch, and Japanese languages from building to building, temporary ones having been erected to receive the apparatus.

But if the Japanese were astonished at these exhibitions, the Americans were not less so by the following one:—On one occasion the atten-

tion of the latter was suddenly riveted upon a body of monstrous fellows, who paced down the beach like so many huge elephants. They were professional wrestlers, and formed part of the retinue of the native princes of Japan, who kept them for their private amusement and for public entertainments. They were about twenty-five in number, and were men enormously tall in stature, and immense in weight of flesh. They merely wore a coloured cloth about the loins, adorned with fringes and emblazoned with the armorial bearings of the prince to whom each belonged, so that their gigantic proportions were seen in all the bloated fulness of fat and breadth of muscle. Their proprietors, the princes, seemed proud of them, and were careful to show their points to the greatest advantage before the strangers. Two or three of these huge monsters were the most famous wrestlers in Japan, and ranked as the champions, Tom Crib or Heenan, of the land. Koyanagi, the reputed bully of the land, was one of them, and walked about with the conscious pride of superior immensity and strength. The natives were desirous that he should be minutely inspected, in order that the hardness of his muscles should be felt, and

the great fatness of his frame should be tested by the touch. Some one attempted to grasp his immense arm, which was found to be as solid as it was huge; and his monstrous neck fell in folds of massive flesh, like the dewlap of a prize ox.

When the time came for the wrestling to begin, the wrestlers, being nearly naked, were brought out into a ring, and the whole number being divided into two opposing parties, walked heavily backwards and forwards, looking defiance at each other, but not engaging in contest, as their object was merely to give the beholders time to form an opinion of their comparative powers, and to make their bets accordingly. They soon retired behind some screens, excepting two, and were then clothed in full dress, and took their seats in front of the spectators.

At last two of the number presented themselves. They glared at each other with brutal ferocity, and were like a pair of fierce bulls. As they continued to eye one another, they stamped the ground heavily, pawing, as if with impatience, and then, stroking their huge bodies, they grasped handfuls of dirt, and flung it angrily over their



backs, or rubbed it impatiently between their giant palms, or under their stout shoulders. They now crouched low, still keeping their eyes fixed on each other, and watching every movement, until, in an instant, they had both heaved their massive forms in opposing force, body to body, with a shock that might have stunned an ox. As they came together, they had thrown their brawny arms around each other, and were now entwined in a desperate struggle, each striving with all his enormous strength to throw his adversary. At last one of the antagonists fell with his immense weight heavily on the ground, and, having been declared to be vanquished, was conducted from the ring.

Another man having been summoned to take his place in it, put on an attitude of defence, with one leg in advance, as if to steady himself and his bent body, with his head lowered, placed as if to receive an attack. Immediately after, in rushed his opponent, bellowing loudly, like a bull, and, making at the man in the ring, dashed, with his head also lowered, and thrust forward against the head of his adversary, who bore the shock with the steadiness of a rock, although the blood streamed down his face. This attack



was repeated over and over again, and thus they kept up their brutal contest until their foreheads were besmeared with blood, and the flesh on their chests rose in great swellings from the repeated blows. All these huge men exhibited their strength in like manner in succession. It was a brutal and savage sight, and one which would only be exhibited in a country of heathens. Let us be thankful that our lot is cast in a very different one.

When the Americans landed their presents, the Japanese showed an extraordinary degree of curiosity to see everything. Besides this, they followed the officers and men about, and seized every opportunity to examine each part of their dress. The caps, boots, swords, and tailed coats of the officers, the jackets and trousers of the men, all came in for the closest scrutiny. They fingered the broad cloth, smoothed down the nap, fathomed the depth of a pocket, and peered curiously into the inner recesses of the seamen's dress. They showed a peculiar passion for buttons, and would again and again ask for one, and, when they procured it, stowed it away, as if it were of the greatest value.

On visiting the American ships, they looked

into every nook and corner—peeped into the muzzles of the guns, examined the small arms, handled the ropes, measured the boats, looked eagerly into the engine-room, and watched every movement of the engineers and workmen. They not only observed everything, but some of them took notes of what they saw.

The American captain, on one occasion, gave a dinner on board his ship to the principal mandarins and other Japanese officials of the town off which his ship was moored. The quantity of food they ate on this occasion was perfectly surprising, mixing fish, flesh, and fowl, soups and syrups, fruits and fricassees, roast and boiled, pickles and preserves, and also drinking the strongest liquors. Nor was this all. As much food was left, which they could not then consume, they brought out large sheets of paper, and packed in them beef, fish, sweetmeats, &c., and then deposited the whole in their large pockets—the sheets of paper (part only, it is hoped) having previously served to blow their noses with! This removal of the food they could not eat is the fashion of the country, for they insisted that their American guests should do the same when they had a feast given them on shore.

All the married women in Japan blacken their teeth and gums, which gives them an unpleasant look when they smile; otherwise, many of them would be thought handsome. They also paint their lips with rouge, and this brings out in greater contrast the blackness of the gums and teeth. It is not uncommon for young females to begin to blacken their teeth as soon as they have been asked in marriage.

From the number of temples in the towns, all of which are places of worship, it might be thought that the Japanese were a religious people, were it not for the gross licentiousness which prevails amongst them. There are certain boxes distributed amongst the temples, which would seem to remind a Christian visitor of the duties of charity, and to think of the poor. His charitable feelings, however, are immediately checked when he learns the object of these boxes, for the label on them announces that the collections in them are "for feeding hungry demons;" and then follows a promise that "his merit will be consolidated." Nothing can show the fearful superstition of these idol-worshippers more than this fact. Let us be thankful that we are taught far better things in this country.

The jealousy of the Japanese with respect to foreigners frequenting their country is very great. If the Americans walked out, they were always preceded and followed by some of the natives, and reports made to the authorities of all they did. Even the shopkeepers were debarred from selling their wares to the strangers. No native, under any pretence whatever, is allowed to leave the country.

There is no public market in many of the towns, as neither beef, pork, nor mutton are eaten, and very little poultry. Vegetables, and a preparation made of beans and rice-flour, which has the consistency and appearance of cheese, are hawked about the streets, and form a considerable portion of the food of the people. The shopkeepers have always a fixed price for their goods, and any attempt to beat them down is useless.

The Japanese showed much respect for the graves of those foreigners who died on board ship and were buried on the land, on a portion of ground granted for that purpose by the Japanese authorities. Of their own accord they placed fences round the graves to protect them. Not only so, but one of the crew having com-



posed the following lines on a departed shipmate, the Japanese cut them neatly on a stone, in English letter, from a copy furnished them :—

“Sleeping on a foreign shore,  
Rest, sailor, rest ! thy trials o’er ;  
Thy shipmates leave this token here,  
That some, perchance, may drop a tear  
For one that braved so long the blast,  
And served his country to the last.”

The following is an instance of Japanese justice. A usurer, or money-lender, was robbed of a sum amounting to about 650*l*. He accused one of his servants of being the thief, and brought him before the magistrate of the district. The man was examined, and protested his innocence ; but, upon his master swearing that no one else could have committed the robbery, he was sent to prison, and sentenced to be executed. Soon afterwards a thief was apprehended, and confessed that he had stolen the usurer’s money. Upon hearing this, the magistrate ordered him, his wife, children, and servants, to be brought before him, and he then told the usurer that, as he had been the cause of the death of an innocent man, they must all lose their heads, saying at the same time that, as he had condemned him



to death without sufficient evidence, he should rip himself up. All present prayed for a mitigation of the sentence. At last the magistrate told them that the man's answers convinced him that he was innocent, and therefore he had concealed him, hoping that the truth would come up. He was then introduced; and, having spared the life of the usurer and his family, he ordered the former to pay the accused the 650*l.*, the amount stolen.

I have now endeavoured to give you a short insight into the character of the natives of Japan, with which we shall shortly, in all probability, be better acquainted. They are an extraordinary race of people, jealous of strangers, very ingenious, have extraordinary memories, and have a language so peculiar that it is understood by no other nation. Some of their arts and manufactures exceed those of any other country. They will not allow books, paintings, or images to be imported, and no women to land under any pretence whatever. Such are the Japanese; and I hope this account of them will have amused you.

## XIX.

## NEW SOUTH WALES.

MY dear friends, you must all of you have heard of Australia, or New South Wales. It is the largest territory in the world that does not bear the name of continent. Much of it is still unexplored, and its circuitous line of coast is supposed to be upwards of 2000 miles. The general face of it is diversified with gentle risings and small winding valleys, generally covered with large spreading trees. There are also a great variety of flowering plants, which gave the name of Botany Bay to a certain district. The heat is seldom excessive in summer, nor the cold very severe in winter. The atmosphere is generally bright and clear. In fact, it is a very extraordinary country, differing, in most re-

spects, from any other, both in animal and vegetable productions. The largest quadruped found in it is the kangaroo, it being sometimes six feet in height. When the young are born they are only an inch long, and are transferred by the female to a sort of pouch under the belly, called an abdominal pouch, in which the young one remains three-quarters of a year, until it weighs nearly fourteen pounds. In defending themselves when attacked, they support themselves on their enormous tail and one foot, and strike with the other, which is armed with a long and strong nail, and thus can rip up their enemy, which is generally a dog employed to hunt them. It has been known to take up a dog in its fore-feet, and strike and kill it with its hind claw. When a female kangaroo has been hunted, and, in order to facilitate her own escape, she has been seen to take her young one out of her pouch, and throw it as far as she could on one side, out of the way of the pursuing dogs; if she escapes, she returns to seek it.

The emeu is the next largest animal found in New South Wales. It is a bird, but a bird without wings, very strong and swift of foot, and able to make a good defence against the

hunter's dogs, by kicking them in a dangerous manner. They were formerly very numerous in a locality still called the "Emeu Plains," but they have been so persecuted that they are now only found at a distance of 300 miles from that place. The female emeu drops her eggs in different places, but the male bird collects them, rolling them to a nest, when the two sit upon them by turns. I have witnessed this fact myself at a menagerie where some were kept, near Kingston-on-Thames. This bird is said to be as swift as the fastest greyhound.

Cockatoos and parrots are in great abundance in Australia, and do much damage to the fruit-trees, as well as in the corn-fields. Sometimes a flock of white cockatoos may be seen on the cultivated land, as if it were covered with a snow-drift. Hundreds of parrots, of various sorts, sizes, and hues, dart through the air in flocks, giving a shrill scream and a flash of brilliant colours as they pass. But the most extraordinary animal in Australia is the water-mole or platypus. This curious creature is very like a large mole, but with the head and beak of a duck. Some one called it a beast with a bill,—like a Christmas tradesman! Its fur

is soft, and prettily shaded from black to silver grey. It burrows in the banks of rivers. It is very shy, and dives at the least alarm, and, like the duck, is web-footed. These animals are said to lay eggs which are hatched as soon as they are laid, and that the young are nourished with milk, which oozes through the fur from the chest of the female; but no teats have been discovered. It swims on the surface of the water, catching flies and other insects, and sometimes it plunges its beak into the mud like a duck.

Amongst many curious birds the black swan should not be omitted. In the time of Ovid, who wrote during the prosperity of the Roman Empire, a black swan was supposed not to exist. It has, however, of late years been introduced into this country from Australia. In some parts of the world there are black eagles; but in Australia there is a white eagle to be found.

Among the curses which an Australian farmer has to encounter is the dingo, or wild dog of the country. They hunt in packs, and break into a place where sheep are shut up for the night, and kill many of them—indeed, many



more than they can devour. They are very cunning and very difficult to get at, owing to their hiding themselves in the thick bush of the country; but I have heard that poisoned meat is now destroying many of them.

The fish of Australia are no less curious than the animals. There is the schnapper, which is of a large size, the flathead, and many others of curious forms and habits. Sharks also abound; and if a dead whale should be drifted into Port Jackson, as sometimes happens, the sharks follow the carcass in great numbers to partake of it. At this time many are taken in the course of a day, some of a very large size. The fins are pickled, and sent to China, where they are considered a luxury, and bring a good price.

This portion of Australia was formerly called Botany Bay, and to which rogues and thieves were transported. Some of you may remember that several years ago a valuable box of sovereigns was robbed from a mail-coach in a very clever way, a similar box having been exchanged for it. Well, the thief was convicted and transported for life, but the gold was never recovered. After some time a female came to Botany Bay

in an emigrant ship, concealing her name, and was hired by the thief as his servant, for he had bettered his condition. It afterwards turned out that this woman was his own wife, who brought the box of gold with her, the contents of which enabled her husband to become a rich and prosperous man in the colony. So much for roguery. Many convicts acquire large fortunes, but chiefly by gin-houses, which detestable spirit is one of the curses of the country, especially in the towns, where drunkenness is carried on to a great extent. At the gold diggings, also, a set of hard-working men will, perhaps, find a valuable nugget of gold. They will take it to a gin-booth and give it to the landlord, saying that they will drink the value of it. In this way they exist in a state of brutal drunkenness for a few days, when the landlord tells them they have had the value of the nugget in gin, although only a small portion of its worth has been drunk, and then they have to go to work for more. Now, had these men taken care of their earnings, they might have returned to this country rich and respectable. Such are the results of gin-drinking. It is said that at Wel-

lington every second house at that place is a public-house!

But it is time to give you some account of the gold discoveries in what were called the gold fields of Australia. When the news of a gold country burst upon the inhabitants of New South Wales, it occasioned the greatest excitement. Almost every one that could flocked to the diggings, so that both gentlemen and tradesmen were left without servants. It was soon afterwards reported that there were 10,000 people at the mines, who were earning from 10s. to 1*l.* a-day each. The government at Sydney issued licenses to diggers at about 30s. a-month, to be paid in advance. Sober and industrious men generally did well; but gin and rum were the ruin of many others, and produced quarrelling and riots to such a degree, that it was said a drunken man with a loaded musket was no better than a mad dog, and he was often treated accordingly.

The diggers rented what were called "claims," consisting of so many square yards, according to the number of miners who worked in them. For instance, a grant of land to a party of

twelve men was twenty-four feet square; and a shaft was usually sunk in the centre of it. The deep holes, some as much as 150 feet in depth, were slabbed with planks all the way down, until they arrived at what they considered the bottom, and then excavations were made in every direction. Here the richest discoveries of gold were made, but it was hard work.

Two brothers, Englishmen, and a friend of theirs, rented a small claim, which they had worked for some time with but little success. Two of them one day went to their tent to get their dinner, leaving one of the brothers at work. Presently he came to a lump of gold which he tried to pull out with his hands, but could not move it. He then proceeded to clear away the soil, when he found the lump increased to a breadth of eight or nine inches. Still he could not remove it. He then covered it up, and ran to the tent and asked for a glass of brandy, as he was faint. Well he might be, for, on clearing it, it proved to be of nearly one hundred pounds in weight of pure gold, worth some thousands of pounds. It was safely conveyed to Melbourne, and from thence shipped to England, where it was purchased by the



Bank of England. An exact model of it was taken and placed in the British Museum, where it may now be seen. Let us hope that the three fortunate miners made a good use of their wealth.

Another piece of gold nearly as large was discovered by a poor native who had been in the service of a settler for seven years, and been kindly treated by him. He attended his flock of sheep, but hearing much talk of the gold diggings, he informed his master where there was some. He, of course, lost no time in going to the spot pointed out, where, sticking out of a quartz rock, he found gold to the value of 4000*l*. In gratitude he gave his servant two flocks of sheep, two saddle-horses, with a team of bullocks to plough the land.

Such was the rage for gold-digging, that even sailors left their ships in order to try their luck. A gentleman said he met one of these fish out of water, who had been robbed on the mountain road whilst lying asleep. He was trying in vain to mount a miserable-looking horse he had bought for the journey. The poor seaman was fairly taken aback, "For," said he, "they have robbed me of a one-pound note, my certificate of discharge from



my ship, three weeks' grub, and my port stirrup, and I am blowed if I can get on the beast without it." The gentleman kindly unrigged the starboard stirrup, and shifting it on the port side, Jack then was able to sling himself on the horse's back, and proceeded on his journey in good spirits.

In order to give you some idea of the quantity of gold collected by different parties, I will mention, on the best authority, that one weekly escort brought into Melbourne 10,138 ounces, and the following week 12,106 ounces of gold. The next week 16,669 ounces were delivered at that place. Within a few days 470,000*l.* worth were brought by ships to England.

Some of you may possibly wish you had been at the diggings, but depend upon it you are better where you are. The work is very severe, and many die from the effects of it; but more from drunkenness and debauchery. When there, you would not have a Fishermen's Home to resort to, or any Church to which you might wish to go. A greater part of the miners were ignorant of a future state or of a blessed Saviour, intent only on collecting gold, and purchasing gin with it. Be content then with your present

situation in life. Yours is an honest calling, not exposing you to dangerous temptations, and enabling you to support your families in comfort and respectability. You probably meet with adverse seasons now and then, and so do farmers and many others, but more prosperous times are sure to arise; at all events, you have no need to fear Botany Bay, the country I have been talking to you about, or to envy the gold-diggers.

## XX.

THE ENGLISH FISHERMEN IN THE  
TIME OF HENRY VIII.

You know that I am always desirous of reading lectures to you that may amuse as well as instruct you, and for this purpose I will go back to the reign of our King Henry VIII., a king who did many worthy acts and many very wicked and foolish ones. However, this has nothing to do with what I am going to tell you.

The Roman Catholic party in France were desirous, in that king's reign, of promoting a war between that country and England for purposes of their own. French pirates were sent out, and they robbed our Channel by seizing every vessel they could get hold of. A sailor, named De Valse, was supplied with ships and stores, and had been allowed to empty the prisons to provide himself with crews. When

he found himself in command of a fleet, manned by these promising fellows, he hovered about the English coasts, pillaging every vessel that came in his way. Part of the gang attacked the Isle of Wight, and others seized upon Lundy Island, a small island in the British Channel, and waylaid the Bristol trading vessels as they passed. And now I am going to tell you of a brave feat performed by English fishermen, and, indeed, it was for this purpose that I introduced the above account, as I know that what I am going to say will please you.

No sooner were these pirates established on Lundy Island, and began to pillage the Bristol traders as they passed, than the fishermen of Clovelly, a town on the coast of Devonshire, manned their boats, after they had ascertained the character of the party on Lundy Island, attacked and drove them off, burnt one of their ships, and made an end of the crew belonging to her. I do not think that our fishermen are degenerated from what they were in those times. At all events, the courage of the Clovelly fishermen deserves to be recorded. The French excused the acts of piracy committed by De Valse, by stating that an English ship was

detained off the coast of Newfoundland, probably by being ice-bound, until they had exhausted all their food, and were in the extremity of famine. In this condition they had been reduced to the necessity of devouring more than one of their own crew. At last a French ship came near with plenty of food on board. This ship the English seized, and, embarking on board of it, set sail, and arrived in England. Some months afterwards the French crew also came there, and made complaints to King Henry VIII. of the treatment they had met with. The king caused the matter to be inquired into, and finding the great distress to which his subjects had been reduced, and the reason of their having dealt with the French in the manner stated, he was moved to pity, and forgave the English, but out of his own purse made a full recompense to the French.

I will now tell you another anecdote which does great credit, not only to British fishermen, but also to their wives. During one of Henry VIII.'s wars with France, that country threatened England with invasion. For this purpose they had collected 200 ships at Havre, and 60,000 men, as well as 60 transports. On the



other hand, although the English had some good ships, they could only muster 12,000 seamen; for numbers of small vessels, manned by fishermen and seagoing people, chiefly from the west coasts, had been either engaged in the Iceland and Ireland fishing fleets, or had been acting as privateers, enriching themselves by plundering the enemy's ships. These were called in as the time of danger approached, to join the admiral's fleet at Spithead. In fact, the naval and fishing services had engaged between them the efficient male inhabitants of the coast towns. In this extremity it was supposed that the home fisheries would be neglected, as at that time fish formed an important item in the food of the people, and it was feared that this supply would fall short. But this anxiety was found to be unnecessary; and how do you think this was done? The fact is recorded to their honour. The wives and daughters of the absent fishermen along the western shores undertook this portion of their husbands' labours. They were the mothers of that hardy generation who sailed with Drake round the world, and explored the Polar Ocean with Davis, who gave his name to the Straits in those seas. These fishermen's

wives would go, eight or nine of them in a boat, with but one boy or one man with them, would pursue their occupation, and had pluck enough to sail a-fishing sixteen or twenty miles to sea, and were sometimes chased home by the Frenchmen, but still they were not disheartened. They continued to bring home a great quantity of fish, and thus did their country good service.

And here I may mention that, when summer came, and the seas were calm, the great French armament, which I have told you was assembled at Havre, put to sea. A few straggling ships, probably in search of plunder, made a first attempt to effect a landing at Brighton. But what was the consequence? The beacons on the hills were set on fire; the inhabitants rose, among whom probably were some of your forefathers, and the French soldiers were bravely driven back before they had committed more than a few trifling injuries. You may be desirous of knowing what became of the great French armament. After some partial actions with the English fleet, they landed some of their troops on the Isle of Wight, and threatened Portsmouth; but, not daring to attack that place, they put to sea, and, after some ineffectual

fighting, they landed their troops at Boulogne, and again proceeded to sea, and made an attack on Seaford, one of the Cinque Ports, and, as you must know, about ten miles from Lewes. Here a landing was effected, and the village was pillaged and set on fire—a wanton act of destruction. At this place the French, thinking the country was unguarded, remained too long, and thus gave the hardy and brave Sussex Volunteers time to assemble. They came down upon the French in swarms. Every wall and every hedge became alive with armed men. They destroyed the boats of the enemy, defeated them, and only a very small portion of the invaders got back to their fleet, which, however, hovered about the Sussex coast. The English admiral, Lord Lisle, although his ships were fewer in number than those of the French, tried to bring on a general action, but he was obliged to hang along the shore, in order that boats might bring off provisions, of which his fleet were sadly in want. After a fortnight of ineffectual cruising, the two fleets were in sight of each other off Shoreham. A light breeze which was stirring came in from the sea. The French were outside, and stretched for five miles along

the offing. Having thus the advantage of the wind, they could force an engagement if they pleased, and Lord Lisle expected that they would bear down upon him. Indeed, an indecisive battle lasted till the evening, when the French retreated behind their larger ships, and by that time the whole line had drifted down within a league of the English. Lord Lisle cast anchor, to show that he was ready for them, if they dared to approach them nearer. As darkness fell, the enemy appeared to be imitating the example, and a general action was looked for in a few hours. A strong wind, however, sprang up at midnight. As the day broke, the space which the French fleet had occupied was vacant, and their last vessel was hull down on the horizon, in full sail for France. The fact was, the plague had broken out in their ships, and thus drove them to their own shores. Such was the conclusion of the mighty effort the French had made to lay England prostrate. They completely failed in doing this, and left the English, almost without a blow, undisputed masters of the sea. Nor was this the only good result of what had taken place. The French had suffered so severely, and the defensive



powers of England had been so remarkably shown, that neither the French, nor, indeed, any other power, would be likely, for a great length of time, to renew the attempt of invasion of this country. Since those days the population of England has wonderfully increased, and, it is hoped, possessed with as much courage and determination to resist invasion as that shown by their ancestors. England is a sacred soil, and our wives and daughters look up to us for protection. Can it be doubted, then, that any attempt at invasion would draw forth the energies, not only of the brave Sussex Volunteers, but of the Volunteers throughout this happy land?

But let me tell you the results of two other attempts at invasion by the French. One was in Ireland, where a force was landed, and soon afterwards made prisoners: the other was in South Wales, when the Welsh women appeared on the hills in their red cloaks, having much the appearance of soldiers, and on some British troops and volunteers advancing against them, the whole of the invaders surrendered themselves prisoners.

Bonaparte also threatened this country with



invasion, and for that purpose assembled an immense army and a great fleet, with numerous gun-boats, at Boulogne. And what was the consequence? England turned out as almost one man to resist the enemy. Volunteers and militiamen came forward to a degree never before known in this country, and the attempt to invade us was abandoned. Come forward, then, like men, whenever you are wanted. All we have to do is to be united, and then we may defy the whole world. Let me add, God bless old England, and God bless our good Queen!

But it is time to conclude. I thought this slight sketch of the courage of our forefathers might interest you, especially as some of it is connected with your own county of Sussex. "Englishmen," as an old writer observed, "are not easy morsels to swallow;" meaning that, if they were attacked, the enemy would find it a tough job to defeat them. But there is a far better way of guarding ourselves against our enemies, and that is, by seeking for the protection of that great and good Being who has promised to be the Friend and Guardian of those who pray for His protection. If we turn our eyes to the present condition of America,

France, Italy, Germany, Mexico, and some other countries, we shall have great cause to be grateful for the many blessings bestowed upon this land. What a harvest we have had ! What peace now at home and abroad ! and what great prosperity, both commercial and political, at the moment I am speaking ! Surely God's goodness has followed us as a nation above all others, and well does it become us to be thankful. Indeed, we have only to compare our condition with that of other countries, and then we shall be the better able to understand the blessings bestowed upon us.

## XXI.

## VOLCANOES AND EARTHQUAKES.

You may have heard of volcanoes, or burning mountains, and I am going to tell you something about them, as it is a very interesting subject.

There can be no doubt that extraordinary revolutions are constantly taking place in the earth, some occasioned by earthquakes and others by volcanic eruptions from mountains—sometimes there is a waste of waters where, a few years before, all was land, and the only land visible consisted of that which was uplifted by a recent earthquake. It has been calculated that there are about 2000 eruptions from burning mountains in the course of one hundred years, which would give about twenty every year. One of the most celebrated eruptions was that of Mount Vesuvius, in the year 79, in the time

of Titus, the conqueror of Jerusalem. It overturned several cities, such as Pompeii and Herculaneum. Great quantities of ashes were carried to Rome, a distance of 110 miles. In the year 1794 another violent eruption took place, when the liquid lava flowed over 5000 acres of cultivated land, and destroyed the town of Torre del Greco. These eruptions still continue, but not to so dangerous an extent.

But I am now going to tell you of an eruption still more fatal. It took place in the year 1715, and was the most frightful recorded in history. About 200 miles from the eastern extremity of the island of Java, is the island of Sumbawa, having some high mountains on it. In the April of the year preceding, the volcano was observed to be in a state of considerable activity, ashes having fallen upon the decks of vessels which sailed past the coast. The eruption of 1715 began on the 5th of April, but was most violent on the 11th and 12th, and did not entirely cease till July. The sound of the explosion was heard in Sumatra, a distance of 970 geographical miles in a direct line, and at Ternate, in an opposite direction, at the distance of 720 miles. Out of a population of 12,000 souls, in the

province of Tomboro, only twenty-six individuals survived. Violent whirlwinds carried up men, horses, cattle, and whatever else came within their influence, into the air; tore up the largest trees by the roots, and covered the whole sea with floating timber. Great tracts of land were covered by lava, several streams of which, issuing from the crater of the Tomboro mountain, reached the sea. So heavy was the fall of ashes, that they broke into the resident's house at Bima, forty miles east of the volcano, and rendered it, as well as many other dwellings in the town, uninhabitable. On the side of Java the ashes were carried to the distance of 300 miles, and 217 miles towards Celebes, and in sufficient quantities to darken the air. The floating cinders to the westward of Sumatra formed, on the 12th of April, a mass two feet thick, and several miles in extent, through which ships and boats with difficulty forced their way.

The darkness occasioned in the day-time by the ashes in Java was so great that nothing equal to it was ever witnessed in the darkest nights. Although this volcanic dust, when it fell, was a perfect powder, it was of considerable



weight when compressed, a pint of it weighing twelve ounces and three-quarters.

Along the coast of Sumbawa and the adjoining islands, the sea suddenly rose to the height of from two to twelve feet, a great wave rushing up the estuaries, and then suddenly subsiding. Every vessel was driven from its anchorage. The town, called Tomboro, on the west side of Sumbawa, was overflowed by the sea, which encroached upon the shore so that the water remained permanently eighteen feet deep in places where there was land before. The shore over which these volcanic effects extended was 1000 English miles in circumference. In the Island of Amboyna, the ground opened and threw out water, and then closed again. Sir Stamford Raffles was Governor of Java when these catastrophes happened, and he furnished the above particulars from authentic sources of information.

Let us now inquire into the terrible effects of earthquakes. In the year 1783 Mount Etna, in Sicily, threw out a very considerable quantity of vapour, which was succeeded by violent shocks of earthquakes. Towns and numerous houses were destroyed, and buried their inhabitants in

the ruins. It was calculated that 40,500 perished during the earthquake, and 20,000 more died by epidemics, caused by insufficient nourishment, exposure to cold and malaria, arising from stagnant lakes and pools, which were formed from the effects of the earthquake. By far the greater number of the sufferers were buried under the ruins of their houses, but many were burnt to death in the conflagrations which almost always followed the shocks. Immense magazines of oils were consumed, ready for exportation, and which occasioned the fires to rage more violently. Many persons were engulfed in deep fissures made in the earth, especially the peasants, while flying across the open country, and their skeletons may now lie buried at the depth of several hundred feet.

A gentleman who visited the town of Polistena, in Calabria, after the earthquake, says, "The scene of horror which presented itself almost deprived me of my faculties. My mind was filled with mingled compassion and terror—nothing had escaped—all was levelled with the dust—not a single house or piece of wall remained—on all sides were heaps of stones, which gave the idea that there could never

have been a town on the spot. The stench of the dead bodies still rose from the ruins. I conversed with several persons who had been buried for three, four, and even five days. I questioned them as to their feelings when in this situation, and they all said that the thirst was most intolerable; but that their mental agony was increased by the idea that they had been abandoned by their friends."

Four monks, who had taken refuge in a vaulted room, the arch of which supported an immense pile of ruins, made their cries heard for the space of three days. Their voices died away gradually, and when afterwards their four corpses were disinterred, they were found clasped in each other's arms.

One of the most tremendous earthquakes which has taken place in more modern times was that at Lisbon in the year 1755. A sound of thunder was heard underground, and immediately afterwards a violent shock threw down the greater part of that city. In the course of about six minutes sixty thousand persons perished, so awful was the calamity. The sea first retired, and laid the bar of Lisbon dry. It then rolled in, rising fifty feet or more

above its ordinary level. Some of the largest neighbouring mountains were violently shaken, as it were, from their very foundations, and some of them opened at their tops, which were split and rent in a wonderful manner, huge masses of them being thrown down into the adjoining valleys. The most extraordinary circumstance that occurred at Lisbon during the catastrophe was the sinking of a new quay, built entirely of marble at an immense expense. A great concourse of people had collected there for safety, as a spot where they might be beyond the reach of falling ruins, but suddenly the quay sank down with all the people on it, and not a single dead body ever floated to the surface. Many boats and small vessels anchored near it, and all, full of people, were swallowed up as if in a whirlpool. No fragments of these wrecks ever rose again to the surface, and the water in the place where the quay had stood was stated to be unfathomable, but it was afterwards found to be one hundred fathoms.

An English gentleman who was at Lisbon at the time of this awful calamity, and who narrowly escaped with his life, has written a most interesting account of it, from which I will



make a few extracts. He says that after stepping over numerous dead bodies, he made his way into the square of the Royal Palace of Lisbon. Here he found the square full of coaches, chariots, chaises, horses, mules, deserted by their drivers and attendants, as well as their owners, the nobility, gentry, and clergy, who had gone to divine worship at the Royal Chapel. They had fled away with the utmost haste. Some of the poor horses were killed, others wounded, and the greater part were left to starve. He adds that he did not meet with a soul who was not bewailing the death of his nearest relations and friends, or the loss of all his substance. In some places lay coaches, with their masters, horses, and drivers almost crushed in pieces. Mothers with infants in their arms, ladies richly dressed, priests, friars, gentlemen, and mechanics might be seen just expiring, or with their backs or thighs broken. Some had large stones on their breasts, and others lay almost buried in the rubbish and crying out in vain to the passengers for help. As soon as it was dark another scene presented itself, little less shocking—the whole city appeared in a blaze. It was on fire in at least a hundred places at once, and



continued burning for six days. Thus the fire consumed almost everything the earthquake had spared.

The account of volcanoes and earthquakes which you have just heard I have taken from the best and most authentic narratives, written by an eye-witness. I will now proceed to apply the subject to your own hearts, and will endeavour to do so with an affectionate desire to be of use to you. You have been told of the sudden and awful effects of an earthquake, and of the bursting out of a destructive volcano. How little time was afforded to the unfortunate sufferers to cry for mercy! Now consider, for one moment, how much more dreadful, and how equally sudden, the day of judgment will be. The ground will not then tremble, or buildings be shaken, but the foundations of the round world will be discovered, when its flaming walls shall give way—the pillars of the universe will totter down, and the whole sink in universal ruin.

It is my wish to impress this awful truth strongly upon you. Keep in your minds that you have, all of you, a soul to be saved: and gladly would I think that you are aware of this,

and are bestowing some thoughts upon it, whether in your boats or on the shore. You have heard how sudden the calamities were which befell some of the human race: the day of judgment will be the last of these, and fearful will it be to sinners. I am anxious to impress this great truth strongly upon your minds, hoping that you will recollect it when I am no more.

## XXII.

## ON LIGHTHOUSES.

You fishermen are acquainted with the great value of lighthouses, as you navigate the stormy seas. Indeed the erection of beacons, to mark the situation of dangerous reefs and sands, was a most important invention. This may be observed more especially in passing along the eastern coast of England. A tower, a flag-staff, or a beacon; some bearing a single light, some double or triple; some fixed, others revolving; of various colours and of various powers—all these are very ingenious, as well as beautiful and useful contrivances, and enable an experienced pilot to ascertain his position on the coast. But in foggy weather, as you must know, lights will have a different colour from what they have in a clear atmosphere. From this, and

a variety of other causes, many distressing shipwrecks annually occur, which no human foresight is able to avoid.

One, however, of the most valuable gifts which has been conferred on the commerce of this kingdom is the lighthouse on the Eddystone rock, a dangerous reef, about ten miles from Plymouth, lying directly in the way of vessels passing along the British Channel. The following account of it, partly written by an old and dear friend of mine, will, I think, interest you.

In the year 1696, a lighthouse was constructed on this spot by Mr. Winstanley, a very ingenious man, who, notwithstanding the extreme difficulty of the position, completed the work in little more than two years. It stood without material accident until the great storm which ravaged the whole island on the 26th of November, 1703, about five years after the lighthouse was built. The engineer happened, at that time, to be visiting the lighthouse, and he had often been heard to say that he wished he might be there "during the heaviest gale which ever blew under the face of the heavens." This wish was, unhappily, gratified, for the

morning after this tremendous gale the building was no more to be seen. It had been completely swept away by the fury of the waves, and not a trace of it was ever afterwards discovered, except part of a chain, which, on making the foundation in 1706, was found so tightly jammed between two of the rocks as to require to be cut out.

The loss of the lighthouse was soon felt, and Mr. John Rudyard, by trade a silk mercer, in London, and a man of great ingenuity, constructed a new building, the exterior of which was entirely of wood, but loaded at the bottom with about 270 tons of stone, to prevent it from oversetting. It was completed in three years, and the light was exhibited for the first time in 1709. This building was of elegant form, greatly superior in appearance to that of Mr. Winstanley's, and somewhat higher, measuring ninety-two feet from the base to the top of the lantern. This great work, after having braved the elements forty-six years, was burnt to its foundation in 1756. The three light-men with much difficulty escaped to shore, one of whom declared that, in attempting to throw water into the lantern, for the purpose of extinguishing the fire,



a quantity of the melted lead had fallen down his throat. The poor fellow died in great agonies a few days after, and, to the astonishment of the surgeons, on opening his body a piece of lead, weighing upwards of seven ounces, was found in the stomach. This may appear to you somewhat marvellous, but it is a well-known as well as a well-authenticated fact.

On the recommendation of the Royal Society, Mr. Smeaton, an engineer of the highest celebrity, was entrusted with the erection of another lighthouse on the Eddystone, in place of that built by Mr. Rudyard. In order to guard against future accidents by fire, he decided on a building of stone; and to prevent the possibility of its oversetting, as the first had done, he constructed the tower courses of heavy blocks of granite, which were dove-tailed into the solid rock, and fastened to each other in like manner. In choosing the form of the new building, he adopted that which Nature presents in the growth of a spreading oak, which has a broad swelling base, gradually diminishing in a beautiful curve as it rises upwards. After encountering many difficulties in the construction, the light was exhibited on the 16th of October,

1759. He fixed the last work on the top of the lantern with his own hands, and remained some days after the whole was completed, to ascertain that all was properly adjusted. He then left the light-keepers in charge, and landed at Plymouth; but a heavy gale of wind coming on, he watched the building with his telescope with anxious curiosity until the violence of the weather had abated. He stated that in a heavy sea he observed at intervals of a minute, and sometimes of two or three minutes, when a combination happened to produce one overgrown wave, it would strike the rock and the building at the same time, and fly up in a white column, covering it like a sheet, rising at least to double the height of the house, and preventing its being seen. In January, 1760, Mr. Smeaton received a letter from the principal light-keeper, stating that for twelve days together the sea frequently ran over the house, which shook as if a man had been up in a great tree. The old men were almost frightened out of their lives, wishing they had never seen the place, and cursing those who had persuaded them to go there. They declared that *the fear* had seized them in the back (an odd place for fear to show itself), and

that rubbing it with oil of turpentine gave them relief. The strength of the sea is not only excited by the wind, but is increased by a strong current which sets towards the Eddystone rock, and which probably gives it its name. The following is a proof of it. A frigate lay in Plymouth Sound, and on one very stormy night the barge, which was moored astern, broke adrift, and was carried out to sea. The accident not being discovered till the morning, all hope of her recovery was abandoned, and the boat-keeper was supposed to have perished. A week afterwards, however, when the Eddystone boat came into harbour, the light-men reported that they had brought one of the frigate's crew, and the sailor, on arriving on board of her, stated that, being fast asleep when the boat parted from the ship, he knew nothing of his adventure until awakened by her striking against the Eddystone rock, and, though wrapped up in the captain's cloak, he, with the help of the lighthouse people, saved himself, the cloak, and one of the oars, when the barge was dashed to pieces.

The appearance of the Eddystone is plain and simple. The dwelling-room is immediately beneath the lantern, so that the men and their

bedding are always kept dry. Underneath is their kitchen. It has now stood firm upwards of a hundred and five years, and shows no symptoms of injury or decay, and the opinion of its strength is so great that, in the worst weather, the men consider themselves as secure as if they were living on shore.

At a later period, a beautiful lighthouse was erected on the Bell Rock, situated on the south-eastern extremity of Forfarshire, at the entrance of the Frith of Tay, and which does great honour to the skill of Messrs. Rennie and Stephenson, under whose directions it was completed on the 1st of February, 1811. It was four years in erection, and Mr. Smeaton's plans for the Eddystone Lighthouse were generally followed. The Bell Rock Lighthouse is a circular building of stone: the diameter below is forty-two feet, the extreme height, from the base to the top of the lantern, a hundred and fifteen feet, of which the lower thirty feet are solid masonry, the wall above being seven feet in diameter, gradually diminishing to one foot at the top of the parapet. The entrance-door is placed immediately above the solid foundation, and is entered by a rope-ladder, which is sus-



pended to reach the water. The interior contains six chambers, with plenty of accommodation for the light-men, who are also provided with excellent quarters in the town of Arbroath, about twelve miles distant, where their families reside. They keep watch by turns for six weeks together at the lighthouse. The light is seen at the distance of twenty miles, and is readily distinguished from others on the coast, being produced by oil-burners set in silver-plated reflectors, each two feet broad, and arranged on a frame of four sides, which is so contrived as to turn round by machinery once in six minutes. A shade of red glass is placed before two of the reflectors, so that in each revolution two of the lights appear red, while the others remain of their natural pale colour. Two large bells, each weighing 1200 lbs., are tolled by the same machinery during thick weather, to alarm any vessel approaching the rock, when unable to see the lights.

The celebrated Sir Walter Scott was once in company with a friend of mine, when he related the following anecdote of the Bell Rock. A Scotch pirate one day landed on it, and, in



a foolish frolic, threw a bell into the sea, which the good monks of Arbroath had placed on it, and which tolled by the action of the waves. Having made some rich captures, the pirate returned homeward, laden with plunder, and stained with crimes. As he approached the rugged coast of Scotland, a furious tempest arose, the sea ran mountains high, the land was obscured by the threatening clouds that burst upon his head, while sea-birds screamed (always a bad omen to sailors, as you know), as the devoted vessel plunged through the roaring surge. The terrified crew gathered round the pirate, who, with a gloomy look, gazed anxiously towards the shore. In an instant the vessel struck on the hidden rocks, and split into a thousand pieces. As the pirate was sinking to destruction, his ears were stunned with the deep echoes of the bell, which tolled him to his fate. Such is an old tradition of the fourteenth century.

It would bring my lecture to too great a length if I were to give you an account of the South Stack Lighthouse, near Holyhead. I will, however, mention one interesting fact, which I have ascertained from lighthouse-keep-

ers, and that is, that migratory birds frequently take their long flights by night. This is proved by their flying against the lights, and being found dead in the morning. This is more especially the case with woodcocks, snipes, and the horned owl, which latter bird generally arrives in this country with woodcocks. If birds arrived in the day-time, they probably, when much exhausted by their long flight, would be much more easily destroyed than they now are. We may, therefore, consider that their nocturnal flights are a wise and benevolent instinct implanted in them by a merciful and benevolent Providence for their self-preservation. Thus those interesting birds, the swallows,—whom no one, I trust, would wantonly destroy,—arrive amongst us in the day-time, which I have myself witnessed, as no good end would be answered if their flight were in the night. These circumstances may appear trifling, but they serve to prove that a kind and benevolent Providence watches over the well-being of His creatures, and that His tender mercies are over all His works. It is more than probable that the All-wise Creator of all things never intended that we should penetrate into the reasons for all

His actions, but we know sufficient to be assured that He has endowed every creature with those powers and properties which are best suited for their several modes of life. Let us, then, wonder and adore; and may that same God of love bless you all!

## XXIII.

## ON SAVINGS' BANKS.

MY DEAR FRIENDS, I am now going to address you on a subject which I think may be of use to you, and I am sure you will give it your serious attention. My wish is to do you good.

You are all of you labourers—that is, you work for your living; whether by sea or land is of no consequence to what I am going to say. Now, I must tell you that I consider a labourer, with the use of his own good right arm, is an independent man. You may be surprised at my saying this; it is true, nevertheless. But, in order to become independent, remember that you must be diligent, thrifty, and sober, avoiding those curses of hard-working men, the ale-house and beer-shop.

But there is another method of becoming independent, and that is, by deposits in a savings' bank. Now, you may think it difficult to put by a trifling sum every week out of your earnings; but be assured that you may do this if you have the will. In the poorest family there are odds and ends of income apt to be frittered away in unnecessary expenditure, but which might be saved. I will give you an instance in proof of this. In a poor village in the north of England, a good clergyman established a savings' bank. It was a very unlikely place to succeed; but he did succeed. The wages of the workmen were only 8s. a-week, and female labourers and servants had much less. The institution rose in four years as follows:—The first year 151*l.* were deposited; 176*l.* the second year; 241*l.* the third; and the fourth, 922*l.*

Let me give you another instance, also well authenticated. The Royal Artillery Corps has 1432 depositors, and their savings on the 31st of March, 1859, amounted to 23,012*l.*, or an average of 16*l.* to each depositor. This was done out of a daily pay of 1*s.* 3*d.* and one penny for beer money, or about 9*s.* 6*d.* a-week, but subject to deductions for extra clothing, &c.



During the Crimean war the Army Works Corps sent home 35,000*l.* of their savings.

The celebrated George Stephenson, who laid out so many miles of railroad, told me one day that he began life as a poor labouring boy, and that it was a source of great joy to him when his wages were raised to 12*s.* a-week, and he said that he was then a made man. He not only maintained himself upon his 12*s.*, but helped his poor parents, and paid for his own education. When his wages were advanced to 20*s.* a-week, he immediately began, like a thoughtful, intelligent workman, to lay by his surplus money, and when he had saved his first guinea he proudly declared to one of his brother-workmen that he was now a rich man; and he was right. For a man who, after satisfying his own wants, had something to spare, is no longer poor; and a person of great experience has declared that he never knew amongst the labouring class of a man who, having out of his small earnings laid by a pound, had in the end become a pauper. In order to show what diligence and intelligence will do, I may mention that Mr. Stephenson told me some years ago that he had lived to lay out forty millions of money in railroads and

other public works, and he died a rich man; but remember, that he began by placing money in a savings' bank.

I will now give you two pleasing instances of the use of savings' banks.

One evening a boy presented himself to draw 1*l.* 10*s.* from the bank. According to its rules a week's notice must be given before any sum exceeding 20*s.* can be withdrawn, and the cashier, therefore, hesitated to make the payment. "Well," said the boy, "the reason's this: mother can't pay her rent; I'm going to pay it, for as long as I have awt she shall hev' it." In another instance a youth drew 20*l.* to buy off his brother, who had enlisted. "Mother frets so," said the lad, "that she'll break her heart if he isn't bought off, and I can't bear that."

You have heard of the London Ragged Schools, and useful and admirable schools they are. Now, in 1859, not less a sum than 8880*l.* was deposited by these poor children, in 25,637 sums by them alone. If this can be done by these children of the Ragged Schools, how much better are you able to do it! Remember that you have all of you to provide against three

contingents : want of employment, sickness, and death. You may escape the two first, but the last must come. It is, however, your duty to provide against the two first of these ; and this you may do by deposits in the savings' bank.

If you will not help yourselves, how can you expect others to assist you? But I am sure that a good, steady, provident man, who has earned an excellent character for himself, if he should be attacked by sickness or any other misfortune, is sure to find friends and assistance. Enjoy your pint of beer or hot coffee, but avoid the ale-house—for you there spend, or rather waste, your money, and ruin your families ; for it has been computed that amongst those who earn a sufficiency to live upon comfortably, one-half of it is too often spent by the man upon objects in which the other members of his family have no share. Now this is selfishness, to say the least of it.

I cannot conceive a much greater pleasure than a working man, with a wife and family, can experience, than a feeling that he is independent—that is, that he has saved up sufficient money to guard against bad times and sickness. Many of you have good, handsome wives, and pretty

children. It is your duty to save up money for them ; and you will enjoy your home much more when you have done this. May I ask you a question? When you have had more money about you than you required for current purposes, have not some of you been tempted to spend it? Is it not, to use a common phrase, apt to burn a hole in your pocket? Are you not easily entrapped into company, and into an ale-house, with its bright fire, and there spend your money foolishly, and perhaps become intoxicated? It is a fearful fact, that in 1859 there were, throughout the kingdom, 152,222 houses licensed to sell intoxicating drink, and only 606 savings' banks. Indeed, in Manchester alone, there are 6306 houses licensed to sell drink, and in the large, populous county of Lancaster, only thirty savings' banks. You see, then, what sad inducements there are to tempt the working classes to impoverish themselves. On the contrary, thousands of working men have been benefited by savings' banks, in which large sums have been accumulated. For instance, a respectably-dressed working man, when making a payment one day at the savings' bank, which brought his account up to nearly 80l.,



informed the manager how it was that he had been induced to become a depositor. He had been a drinker, but one day accidentally finding his wife's savings' bank deposit-book, from which he learnt that she had laid by about 20*l.*, he said to himself, "Well, now, if this can be done while I am spending, what might we do if both were saving?" The man gave up his drinking, and became one of the most respectable men of his class. "I owe it all," he said, "to my wife and the savings' bank."

It is my wish to impress upon you that, if you do not lay by money, you cannot improve your present condition. You are fixed like a limpet to the rock. But with some money at your command, you may find various methods of laying it out to advantage. Recollect, also, that if you cannot deposit one or two shillings every week, you can put into the Penny Bank, and this generally leads to larger deposits.

I have only to add, that I trust all of you will avoid the great sin of drunkenness. It is a sort of leprosy, clinging to many in this happy country. People may talk of deaths by war, by disease, or famine; but be quite sure that, destructive as these are, they are nothing when



compared with the deaths caused by intemperance. People also talk of reforms—such as reforms in Parliament, in religion, &c.—but depend upon it, that the great reform we want is the enfranchisement of our fellow-creatures from the degrading effects of drunkenness. The filth and misery which fester round the drunkard must be seen in order to be known. He is, in fact, worse than a brute to himself, as well as to his wife and children, degrading them and degrading himself. Remember that drunkenness makes some men fools, some men beasts, and some men knaves.

I have now entered my eighty-second year, and may have but few opportunities of addressing you again; but it would be a great happiness to me to think that what I have now affectionately said to you will be borne in mind when I am no more. May God, of His infinite mercy, bless you all!



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